

LOW VISION IN CHILDREN AND ADOLESCENTS: HOSPITAL BASED STUDY

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ABSTRACT

One thousand five hundred clinical records were chosen from the Medical Records Department of the eye clinic, Central Hospital, Benin, Edo State between 2000 and 2004 by cluster random sampling method. Data was classified according to the different etiologies of low vision, gender, congenital and acquired causes, anterior and posterior anomalies and according to World Health Organization's classification. Of the 246 found aged below 20yrs, 37 (15.04%) had low vision. The prevalence of low vision was thus 15.04%. The leading cause of low vision was cataract (23.32%). Myopia and optic atrophy contributed 16.22% respectively, aphakia/dislocated lens, 13.51%. retinitis pigmentosa 10.81%, macula degeneration 5.41%, glaucoma and nystagmus 2.70% respectively and the unknown cause 8.11%. 64.86% had moderate low vision, 10.81% was in the profound low vision group, 13.51% was in the near total blindness group, while 7.92% had unilateral loss of vision. 15.76% males were involved while females were 43.24%. Acquired anomaly was 1(2.70%) and posterior segment anomalies were 22(59.46%) respectively. A significant difference was found between the congenital causes of low vision and the acquired ($P>0.05$), congenital causes lead to more low vision cases. There was no significant difference in the sexes ($P<0.05$). There was also no significant difference in anterior and posterior segment anomalies as the causes of low vision ($P<0.05$). Therefore the cause of low vision in children and adolescents were largely preventable.

KEYWORDS: Low vision, Children, Cataract, Myopia, Congenital anomalies.

INTRODUCTION

Low vision (partial sight), is a bilateral impairment to vision that significantly impairs the functioning of the patient and cannot be adequately corrected with medical, surgical therapy and/or best optical correction provided by regular lenses or contact lenses. It is often a loss of central acuity or visual field loss of light sensitivity, distorted vision or loss of contrast. It is generally agreed that an acuity of $<6/18$ or poorer for the better eye with best corrective lenses constitutes low vision when visual field is $<20^\circ$ and causes limitation of vision¹. Thus, the impairment of performance not just visual acuity is the ultimate criterion for classifying a low vision patient.

According to the definition of low vision or partial sight, it is assumed that visual loss is bilateral: some form of vision remains and that regular lenses used are not low vision aids like Add above +4.00D, telescopes, visor, pinhole, side shield among others. In terms of low vision aids to improve visual performance, there is a great unmet need for the partially sighted population. Majority of those with partial sight have never had an adequate visual examination.

Thus, many patients who should have been helped are now being cast aside, because of lack of knowledge/opportunity on the part of the parents and the eye care practitioners as well². Visual aids can improve visual performance and they depend on many factors beside the visual acuity (VA). However with VA better than 20/600 after regular correction chances are excellent while with VA poorer than 20/2000 the chances of improvement with visual aids are slim³.

The aim of this study was to identify the cause of low vision in children and adolescents and to find the prevalence of low vision in children and adolescents. The study was also structured to determine the greatest aggregate contributor to the burden of low vision, whether anterior or posterior chamber anomaly and whether congenital or acquired disorder.

MATERIALS AND METHOD

The type of design used was known as *selected description* since certain aspect of a population or phenomena were considered. It was a retrospective study in which past records of patients who attended the Central Hospital, Benin

City were randomly selected. The study population was patients aged below 20 who attended the Central Hospital, Benin City eye clinic from 2000 to 2004 (five years). They comprised 1,500 case files, 300 cases were chosen per year, out of which 246 were aged below 20 years, and 37 of these satisfied the selection criteria of low vision. The criteria for selected of those with low vision was VA less than 6/18 or poorer in the better eye with the best corrective lenses and the condition must be bilateral with some form of vision remaining.

The study was based on the available low vision case records of the patients seen at the hospital medical records department. A total of 246 case files were thus looked at from which all those files with visual acuity less than 6/18 or poorer with the best corrective lenses were chosen for use in the analysis; from this, a total of 37 case files were certified as low vision patients.

Data obtained were classified according to etiology and WHO classification and analyzed.

RESULTS

Out of 246 case files studied, 37 cases of low vision were found. Low vision was found more in males (54.76%) than in females (43.24%); table 1). Using WHO classification of low vision, those in group A was found to be more common (13) and was predominantly females (68.75%) than males (61.90%). Group C was found to have the least prevalence (see table 2).

Table 3, shows that myopia, aphakia, dislocated lens, cataract, optic atrophy, macular degeneration were among the major cases of low vision. Using WHO classification, congenital cause of low vision was found to constitute 97.29% of low vision cases studied. Congenital causes of low vision featured in the four classes of low vision while acquired causes only featured in group A (see table 4). Also using WHO classification, anterior and posterior segment anomalies were found to contribute to cause of low vision in the four classes with posterior segment contributing more (59.46%) than anterior segment (40.58%; table 5).

WORLD HEALTH ORGANIZATION:

| CATEGORY | CLASSIFICATION |
|-----------------|----------------------|
| A < 6/18 & 6/60 | Moderate low vision |
| B < 6/60 & 3/60 | Severe low vision |
| C < 3/60 & 1/60 | Profound low vision |
| D < 1/60 - <LP | Near total blindness |

DISCUSSION

Visual impairment particularly low vision had been found still prevalent in our society today. In the developed countries the prevalence in the total population is quite low with most causes being due largely to age-related disease changes, which are untreatable³. In the developing countries like Nigeria however, the prevalence found was high. The purpose of this study was to determine the prevalence and causes of low vision in children and adolescents. Of the 246 patients cards studied whose ages were below 20, 37 had low vision.

This showed a prevalence of 15% which was high compared to prevalence in developed countries: according to a study by Munoz et al¹, the prevalence of visual impairment and blindness in the Americans and Caribbeans was 4.5%.

Fasina et al², reported a high prevalence of low vision in developing countries stating that of the 135 million people who were visually impaired, 90% are from developing countries. Also Evans et al³, reported a prevalence of 12.4% but it was in patients aged 75 and older in Britain. Dineen⁴ reported a prevalence of 13.8% in Bangladesh. Saw et al⁵ however, reported a prevalence of 5.8% in Indonesia.

Other researchers had found various prevalence figures though they lumped blindness and low vision together, they include: Akinsola and Ajaiyeoba⁶ who found the causes of low vision and blindness in children in a blind school in Lagos to be, retina 30.8%, lens 23.1%, glaucoma 19.2%, cornea 11.5% and optic nerve 7.7%.

Also Abdul⁷ found the prevalence and causes of low vision and blindness in the general population in Dambatta, Kaduna Nigeria to be 3.19%. The high prevalence of low vision among children and adolescents who visited the central hospital, Benin could be attributed to a lot of factors: which include ignorance or lack of education of the parents. Personal interview showed that a lot of uneducated mothers and even the educated took drugs which they were not supposed to take during pregnancy like steroids which have been proven to cause congenital cataract.

A lot of mothers and children were possibly malnourished, and this could affect the child's development generally, including vision.

Implicated here is vitamin A deficiency, which can lead to blindness and low vision. Study by Kello and Gilbert⁸ showed that vitamin A deficiency and measles were the major causes of severe visual impairment and blindness in children in schools for the blind in Ethiopia. Another contributory factor to the high prevalence found in the study was that most parents did not consider it necessary to send their children for eye examination when they noticed any problem with their sight. Even when they did and were asked to get glasses, they refused claiming that glasses were meant for older people, they also refused that their children should undergo eye surgery (congenital cataract) when the condition was noticed. Thus, conditions which could have been halted were left to progress to low vision like myopia that is usually progressive. The study showed that the major cause of low vision was cataract, which can be treated through surgery and lenses given early in life. Thus, the backing of operable cataract in children and uncorrected refractive error also lead to a high prevalence.

The study revealed that cataract contributed the highest prevalence of low vision (24.32%) followed by myopia (16.22%) and optic atrophy (16.22%). Aphakia/dislocated lens (13.51%), retinitis pigmentosa (10.81%), macula degeneration (5.41%), glaucoma and nystagmus 2.70% respectively and unknown cause (8.11%). This is in line with work done by other researchers^{2,7,9,10,11}.

According to WHO classification, 64.87% of the study population had moderate low vision, 10.81% had severe low vision, 10.81% had profound low vision and 13.51% were in the near total blindness group. This shows that a lot of children will benefit from low vision aids since a higher percentage 64.86% were in the moderate low vision group and the prognosis for this group is excellent. Thus the need for children with low vision to have low vision refraction cannot be over-emphasized.

The study also revealed that 2.71% of the low vision population was due to acquired causes while 97.29% was due to congenital causes (table 4). The study however showed that there were significantly more congenital causes of low vision than acquired. This agreed with the work done by Gothwal et al¹² on the characteristics of Paediatric low vision in India; he showed that the major causes were hereditary causes of congenital glaucoma, macula degenerations, retinitis pigmentosa, optic atrophy and albinism. Akinsola et al⁶ also showed that the causes of low vision appeared to be different from those of blindness as hereditary and intrauterine factors were mainly responsible for low vision. Table 5 shows that (40.45%) had anterior segment anomalies leading to low vision while 59.46% had posterior segment anomalies. However this difference was not significant statistically ($P < 0.05$), although it was in line with work done by Akinsola et al⁶ who reported that in terms of anatomical sites the posterior segment contributed more than anterior segment anomalies. Statistical analysis using the T- test showed that the prevalence of low vision was not gender related, and this was in line with the work done by Ezepue¹⁰. Also there was no significant difference in anterior and posterior segment anomalies with regard to etiology of low vision.

In conclusion therefore, a significant number of children living with low vision in Edo State are treatable and preventable. Thus efforts should be made by the government, organizations, eye care practitioners, parents and guardians to help and collaborate to detect these diseases early and treat them to prevent blindness and low vision. School eye health and vision screening should be emphasized and intensified. Pregnant mothers should be properly counseled on nutrition and drugs during and after pregnancy. Immunization against childhood diseases should also be intensified.

TABLE 1: CLASSIFICATION OF LOW VISION SAMPLE ACCORDING TO GENDER

| Sex | Frequency | % |
|--------|-----------|-------|
| Male | 21 | 54.76 |
| Female | 16 | 43.24 |
| Total | 37 | 100 |

TABLE 2: CLASSIFICATION OF LOW VISION SAMPLE ACCORDING TO WHO CLASSIFICATION GENDER

| Group | WHO classification | Male | | Female | |
|-------|--------------------|-----------|-------|-----------|-------|
| | | Frequency | % | Frequency | % |
| A | >6/18-6/60 | 13 | 61.90 | 11 | 68.75 |
| B | >6/60-3/60 | 2 | 9.52 | 2 | 12.50 |
| C | >3/60-1/60 | 3 | 14.29 | 1 | 6.25 |
| D | >1/60-LP | 3 | 14.29 | 2 | 12.50 |

TABLE 3: CLASSIFICATION ACCORDING TO CAUSES AND GENDER

| Causes | Males | % | Females | % | Total | % |
|-------------------------|-------|-------|---------|-------|-------|-------|
| Glaucoma | - | - | 1 | 6.25 | 1 | 2.7 |
| Cataract | 7 | 33.33 | 2 | 12.5 | 9 | 24.32 |
| Myopia | 3 | 14.29 | 3 | 18.75 | 6 | 16.22 |
| Optic Atrophy | 4 | 19.05 | 2 | 12.5 | 6 | 16.22 |
| Macula degeneration | - | - | 2 | 12.5 | 2 | 5.41 |
| Nystagmus | 1 | 4.76 | - | - | 1 | 2.70 |
| Aphakia/Dislocated lens | 2 | 9.52 | 3 | 18.75 | 5 | 13.51 |
| Retinitis pigmentosa | 3 | 14.29 | 1 | 6.25 | 4 | 10.81 |
| Unknown | 1 | 4.76 | 2 | 12.5 | 3 | 8.11 |
| Total | 21 | 100 | 16 | 100 | 37 | 100 |

TABLE 4: CLASSIFICATION ACCORDING TO WHO CATEGORIES OF ACQUIRED AND CONGENITAL CAUSES.

| Group | WHO classification | Acquired | | Congenital | | Total (%) |
|-------|--------------------|-----------|------|------------|-------|-----------|
| | | Frequency | % | Frequency | % | |
| A | >6/18-6/60 | 1 | 2.71 | 23 | 62.16 | 64.87 |
| B | >6/60-3/60 | - | - | 4 | 10.81 | 10.81 |
| C | >3/60-1/60 | - | - | 4 | 10.81 | 10.81 |
| D | >1/60-LP | - | - | 5 | 13.51 | 13.51 |
| Total | | 1 | 2.71 | 36 | 97.29 | 100 |

TABLE 5: CLASSIFICATION ACCORDING TO WHO CATEGORIES OF ANTERIOR AND POSTERIOR ANOMALIES.

| Group | WHO Classification | Anterior | | Posterior | | Total (%) |
|-------|--------------------|----------|-------|-----------|-------|-----------|
| | | Freq. | % | Freq. | % | |
| A | > 6/18 ó 6/60 | 6 | 16.22 | 18 | 48.65 | 64.87 |
| B | >6/60 ó 3/60 | 2 | 5.405 | 2 | 5.405 | 10.81 |
| C | >3/60 ó 1/60 | 2 | 5.405 | 2 | 5.405 | 10.81 |
| D | > 1/60 ó LP | 5 | 13.51 | - | - | 13.51 |
| Total | | 15 | 40.54 | 22 | 59.46 | 100 |

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