Causes of low vision and visual outcome after using Low Vision Devices in Sudanese Children

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Abstract
Aims: To determine the main causes of low vision in Sudanese children, evaluate low vision services provided to them and to assess their visual outcome after using low vision devices (LVD) for distance and near tasks.

Material and Methods: This study was conducted in Makkah Eye Complex, Khartoum and Walidain Charity Eye Hospital, Omdurman, Sudan from September 2006 to March 2006. Patients included in this study were seen first by an ophthalmologist and then refracted and assessed for LVDs by an optometrist. All children in the age group 1 – 16 years attending low vision clinics during the above mentioned period were included in the study. Results: The study included 239 children with low vision. Majority were 12 years of age and above. Few children presented before the age 6. Males were more than females (55.2 % and 44.8% respectively). There were 20 diseases causing low vision in children, of which, retinitis pigmentosa was the commonest (16.7 %) followed by congenital cataract (14.2 %). Conclusion: Children seeking low vision consultation present at school age (12 years and above), hence, School children need to be examined regularly to diagnose low vision and its causes as early as possible, as many causes are either preventable or curable at early stages. Ophthalmologists and optometrists must be aware about the benefit and value of using LVDs for children.

Keywords: Low vision; Children; Sudanese; visual outcome; low vision devices.

INTRODUCTION
Low vision is a bilateral subnormal visual acuity or abnormal visual field resulting from disorders in the visual system. A person with low vision is one who has impairment of vision even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task.¹

New data based on the 2002 global population show a reduction in the number of people who are visually impaired from the effects of infectious diseases, but an increase in number of people who are visually impaired from conditions related to age.² In Africa it is estimated that there are about 7 million blind people and more than 20 million with low vision.² It has been estimated that very few people with low vision, possibly only 5-10%, actually use low vision rehabilitation services.³
Functional vision refers to the use of vision for a particular purpose. Even very small amount of vision can be useful. Functional vision may be improved with refractive correction, low vision devices or instruction in the use of vision.\textsuperscript{4} Visual impairment in children is associated with developmental delays and the need for special educational, vocational, and social services, often beyond childhood into adulthood. This study aims to determine the main causes of low vision in Sudanese children, evaluate low vision services provided to them and to assess their visual outcome after using low vision devices for distance and near tasks.

MATERIAL AND METHODS
This study was conducted in Makkah Eye Complex, Khartoum and Walidain Charity Eye Hospital, Omdurman, Sudan from September 2006 to March 2006. Patients included in this study were seen first by an ophthalmologist and then refracted and assessed for LVDs by an optometrist. All children in the age group 1 – 16 years attending low vision clinics during the above mentioned period were included in the study. A data sheet was filled in after taking verbal consent of the parents. It included age, gender, cause of low vision, unassisted visual acuity for distance and near, low vision devices used for distance and best corrected visual acuity for them, and low vision devices used for near vision and best corrected visual acuity with them. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 10.0

RESULTS
The study included 239 patients. The age ranged between 3 and 16 years, with the majority of them (121, 50.6\%) aged 12 years and above (Figure 1). Males over-numbered females among study sample (132:107). Twenty per cent of patients attending low vision clinics in Makkah and Walidain Eye hospital during the study period were between 3 and 16 years of age. In this study, 20 diseases were reported to cause low vision in children (Figure 2). Retinitis pigmentosa was the main cause of low vision, accounting for 16.7\% (40 cases). Congenital Cataract was the second commonest cause accounting for 14.2\% (34cases) followed by Nystagmus and optic atrophy (13.4\% and 11.7\% respectively). If classified anatomically, globe anomalies represented 74.8\% of all cases, followed by posterior segment disorders (21.3\%) and anterior segment disorders (3.8\%).

The majority of patients (105) had visual acuity ranging from 6/18 to 3/60; 60 cases presented with visual acuity between 2/60 to counting fingers (CF); 27 cases had visual acuity of hand movement (HM) or perception of light (PL) and 9 cases were totally blind (NPL). In 24 cases, the vision could not be recorded due to young age or uncooperativeness.

Regarding near vision, only 46 patients managed to perform Jaeger test for near task. Nine patients managed to read Jaeger test (ST) 150 – 130, 16 cases Jaeger (ST) 120 – 100, 20 patients Jaeger test (ST) 90 – 70 and only 1 patient Jaeger (ST) 60 – 50. None of the patients managed to read Jaeger (ST) 40 – 30.

After examination, low vision devices for distance were given to patients as follows: 112 patients were given distance glasses, 46 patients were given binocular and monocular telescopes, 32 patients were given both distance glasses and telescopes. There was no improvement of vision in 49 patients with LVDs and the rest of the patients were kept under observation. Improvement of vision after using LVDs ranged from 2 To 6 lines on Snellen chart.

Low vision devices for near were given as follows: 76 patients improved by reading glasses, 26 patients improved by hand held magnifier, stand magnifier, and dome magnifiers, 1 patient improved by both reading glasses and magnifiers. The improvement in near vision after using LVDs ranged from 20 – 90 Jaeger test (ST) points.
DISCUSSION

Low vision services did not exist in Sudan until 2005 when the first low vision department was established at Makka eye hospital in coordination with the National Programme for Prevention of Blindness followed by establishing the second low vision center at Walidian charity eye hospital.
in 2006. The two centers are actively providing low vision services to large numbers of patients. Qualified optometrists and ophthalmologists who were trained by WHO abroad are working in both centers. The performance of low vision centers in Sudan needs to be evaluated regularly, and this study aims to do so in relation to children with low vision as one of its objectives.

An estimated 1 in 250 children are visually impaired as a result of eye disease. Some of the children have nearly normal vision, some are totally blind, but the majority falls into a broad range between these two points. Children are said to have 'low vision' or 'partial sight' when they have: (a) a corrected visual acuity in the better eye of <6/18 to 'perception of light' (or a visual field of less than 10 degrees); and (b) the ability to use their residual vision to orientate themselves or to perform tasks.

Retinitis pigmentosa was the most common cause (16.7%) of low vision in our study. The exact cause for this is unknown, but consanguineous marriage may be an attributable cause. Corneal opacities were the cause of low vision in only 9 patients (3.8%). The major cause of low vision and blindness in children in India was corneal scarring (26.4%), mainly due to Vitamin A deficiency, followed by congenital globe anomalies (20.7%).

Ophthalmologists and optometrists must be aware about the benefit and value of using LVDs for children. School children need to be examined regularly to diagnose low vision and its causes as early as possible, as many causes are either preventable or curable at early stages.

References: