

## School Eye Health Screening in a Province in the Democratic Republic of Congo – A Pilot Study

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**Introduction :** The Democratic Republic of Congo (DRC) is the third largest country by area (2.345 million km<sup>2</sup>) and one of the most populous countries in the African continent<sup>[1]</sup>. It shares its borders with 9 countries, and 2 borders (with Angola in the south and the Congo in the west) which extend for more than 2000 km. Although no census has been carried out since the 1980s<sup>[2]</sup>, in 2012, DRC had an estimated population of 78.1 million persons with 14.7 million children aged <5 years and around 48% of the population being under the age of 15 years<sup>[1, 2]</sup>. Approximately 70% of its population lives in rural areas<sup>[3]</sup>. It is estimated that about 5 million people died due to war, famine and diseases since the first and second Congo wars which began in 1996. In addition, due to the unrest, a large number of people got displaced from their homes. Their number being maximum in 2013, with more than 2.9 million internally displaced persons (IDPs) and 438,869 Congolese moving to other African countries<sup>[4]</sup>. The country has 515 health zones, with the national health system being decentralised at the provincial level and funded by public and private agencies. The remote areas of the country lack both in human and material resources<sup>[3,5]</sup>. DRC is also among the countries in the world with the highest rates of child malnutrition. Although malnutrition is widespread in all provinces there are important geographic variations and the occurrence is significantly higher in rural than in urban areas<sup>[6]</sup>.

This country has a high literacy rate: 84% for men and 61% for women. Many children in the Nord Kivu province attend school in Goma city, which is one of the bigger cities of DRC. However the schools in the villages are small with many of them being accessible only on foot especially after the rains.

**Purpose of study :** The aim of the study was to find out the baseline prevalence of ocular ailments in school going children in Goma province of Democratic Republic of Congo. In addition a conscious effort was

made to educate the children, their teachers, as well as parents about the various aspects of maintaining good ocular health by way of health education lectures, charts, clay models as well as live demonstration. The common eye related problems as well the symptoms which warrant an early referral were also discussed. Ocular disorders requiring an urgent referral to an Eye Centre are discussed in details [TABLE 1&2]<sup>[7]</sup>.

**Table 1 -Ocular disorders requiring an urgent referral to an Eye Centre**

Sr. No.	Symptoms requiring referral to an eye spl
1.	Wandering eye or the eyes which don't look straight.
2.	Cloudiness, either in the front of the eye (cornea) or inside the eye.
3.	Excessive watering or discharge from eyes
4.	A red eye or one that a child is constantly rubbing.
5.	A droopy eyelid that may be interfering with sight
6.	Holding or tilting his or her head to one side to see objects.
7.	Squinting or making a slit of eyes to see

**Table 2-Common eye related problems in children**

Sr. No.	Common eye related problems in children
1.	Refractive Errors
2.	Trachoma
3.	Squint
4.	Vitamin A deficiency
5.	Ocular injuries
6.	Conjunctivitis
7.	Less common: congenital cataract, glaucoma, cornea/optic nerve/ retina disease

The schools were spread far apart with some being located in extreme remote areas. Many of the areas had no access to eye care and since people were poor, they could not afford to travel to bigger towns for their treatment.

There is only one single ophthalmologist catering to this area of around 300km. It was the first ever school eye health survey in this entire region.

**Materials and Methods :** Children of 8 schools in Goma province were screened. These schools were located at a radius of 15-20kms in and around Goma. Visual acuity was tested with alphabet or E-chart. An interpreter was used whenever needed. Past ocular history was taken when available. Colour vision defects were tested with the Ishihara's pseudoisochromatic plates in bright day light. Children below 6 years of age, due to obvious disadvantage in comprehension, were asked to trace lines on the plates rather than identify numerals. Refraction and detailed ocular examination were done as and when required at the base hospital in Goma where slit lamp examination, tonometry and visual fields, when needed, were done by arranging for the children to be brought to the base hospital.

Teacher orientation to the importance of eye care and their role in simple eye care delivery was achieved by demonstrating the signs and symptoms of common conditions like trachoma, xerophthalmia, and refractive errors. Vision testing with Snellen's chart was also taught to them, as also the concept of prevention of eye injuries and first aid emergency care for eye injuries. Health Education of teachers and children dealt with prevention of common eye diseases, classroom illumination and role of nutrition in maintenance of lifelong good vision.

**Results :** A total of 900 children of age between 6 - 12 years were screened [FIGURES 1 and 2] .



**Figure 1: Vision screening of school children in progress**



**Figure 2: E Or Tumbling C - Charts were used where the child seemed to be having some problems in comprehension.**

This was done over a period of 3 months and at schools in and around Goma, depending on the weather conditions and accessibility by road. Male children, 498 (55.33%) were slightly more than the females 402 (44.66%). The most common ocular ailment detected was uncorrected refractive errors, seen in 135 (15%) children [TABLE -3].

**Table 3- Breakdown of children with refractive errors**

Visual Acuity	< 6/9	<6/12	<6/18	<6/24	<6/36	<6/60	6/60 - 3/60	<3/60	Total
Number of Children	38	22	23	14	10	8	10	10	135

A visual acuity of less than 6/9 (SNELLES) in either or both eyes was diagnosed as a case of refractive error and they were prescribed spectacles. These were given to them at the base hospital. Myopia, (41), was the most common refractive error. Allergic conjunctivitis was surprisingly the second most common cause of ocular morbidity seen in 65 (7.22%). The breakdown of the other various ailments are as follows: corneal opacities in 24 (2.67%), pterygium in 6 (0.67%), cataract in 11(1.22%), uveitis in 8 (0.89%) and squint was seen in 4 (0.44%) [TABLE 4]

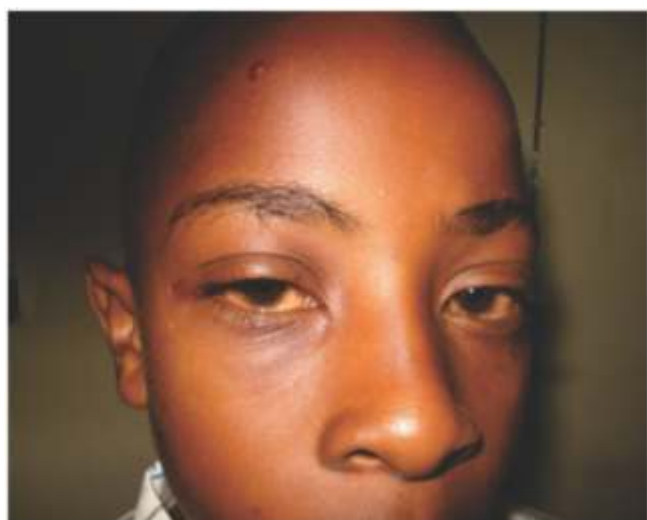
**Table 4 - The various ocular disorders and their frequency among the school children**

Ocular Disorder	Number
Refractive Error	135
Allergic Conjunctivitis	65
Corneal Opacities	24
Cataract	11
Uveitis	8
Squint	4
Others ( Trachoma / Bitots spots /Ptosis )	11
<b>TOTAL</b>	<b>258</b>

[FIGURES 3, 4 and 5] No new cases of onchocerciasis were observed, though the area was supposed to be in endemic zone before the advent of APOC programme.



**Figure 3. : A case of traumatic cataract.**



**Figure 4. : A surprising large number of children were suffering with allergic conjunctivitis.**



**Figure 5. : A case of squint.**

**Discussion** : To the best of our knowledge, this was the first ever recorded school eye health survey in this entire Goma region. A small scale study involving only 81 children had been carried out at Kinshsa in 2007 to identify the causes of childhood blindness in the Democratic Republic of Congo <sup>[6]</sup>. According to this study corneal opacity /scarring was the commonest cause of childhood blindness, responsible for upto 20% of blind children. A recent large scale study carried out in Nepal too revealed corneal opacity to be most commonly responsible (39%) , for unilateral blindness <sup>[9]</sup>. However in our study there were only 24 (2.7 %) of cases with corneal opacities. The most common cause of ocular morbidity was uncorrected refractive errors, detected in upto 135 (15%) of the children. Out of these, 10 children were blind and the prevalence of childhood blindness (best-corrected visual acuity <3/60) was 1.11%. Earlier studies done elsewhere, too have revealed that uncorrected refractive error was a major cause of visual disability among children all over the world and affects nearly 13 million under the age of 16 years <sup>[8,9,10]</sup>. Rather in 2010, one large scale study also revealed that uncorrected refractive error is the second leading cause of blindness worldwide, affecting a total of 108 million people or 1 in 90 persons <sup>[9]</sup>. Recent data shows that more than 90% of people with uncorrected RE, worldwide, reside in rural and low-income countries. <sup>[11]</sup>

The higher incidence of allergic conjunctivitis could be due to an active volcano in the region, with the fumes from the volcano being the causative agent. The incidence of cataract was more than expected and moreover as few people had access to ophthalmic care, cases could be under-reported. The APOC programme for onchocerciasis has been successful in most places around Goma and no fresh cases had been reported. Goma being at a higher altitude and away from fast moving streams and rivers would not be an ideal site for vector flies <sup>[12,13]</sup>.

**Conclusions** : This being the first school eye health screening program, could be a guideline for further surveys and help in implementation of school eye health programs in the province, thus reducing the quantum of preventable blindness. Smaller sample size was due to inaccessibility of villages, and security concerns. Early vision screening and correction of refractive errors have been shown to be important not only for ensuring better visual outcomes but also resulting in an improved school performance. In addition they may have severe social and economic implications if uncorrected.

Program to train teachers as screeners was



concurrently started as it was felt that children with substandard vision could be directed to an ophthalmologist and their visual acuity could be improved, as well as, amblyopia prevented. Cases with congenital or developmental cataracts could also be treated as early as possible. The need for regular school eye health surveys was discussed with the provincial government and arrangements made for regular teacher training as well as need for training more ophthalmologists.

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