

# Refractive errors in albino children in Brazzaville

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## Abstract

We evaluated refractive disorders in Albino children of Brazzaville and assessed their impact on the visual acuity of these children.

**Patients and method:** Our study was conducted at the University Hospital of Brazzaville in October 2018 as part of a special program of the Congolese Association of Albinos aimed at providing glasses free of charge to albino children. This was a cross-sectional study of 32 children with oculocutaneous albinism.

All children received a complete ophthalmological examination. Ametropia was measured by cycloplegic autorefraction performed approximately 45-60 minutes after topical instillation of 3 drops of 1% cyclopentolate administered 5 minutes apart.

**Results:** All children had nystagmus, including 2 cases with strabismus (6.25%). All children had astigmatism, 56.25% of whom were hypermetropic. The mean corrected visual acuity in the better eye was 0.18+/-0.14. The Mean uncorrected visual acuity in the better eye was 0.33+/-0.15. The improvement in visual acuity after correction was statistically significant  $P=0.002$ .

**Conclusion:** Albinism is associated with a variety of ocular anomalies including ametropia. Hypermetropic astigmatism was the most common refractive error identified in our series. Correction of this ametropia results in a statistically significant improvement in visual acuity.

## Introduction

Albinism is a group of inherited disorders that are characterized by a reduction or absence of melanin pigment in tissues, in conjunction with ocular and visual pathway developmental abnormalities. The most characteristic manifestation of albinism is related to hypopigmentation in the visual system and/or the skin and teguments. This lack of production of melanin is associated with specific changes in the eye such as foveal hypoplasia and misrouting of optic fibres from the retina to the visual cortex [1].

These changes explain the low visual acuity that presents from birth. In addition, albinism is also associated with refractive disorders and reduced visual acuity [2].

The purpose of this study is to determine the refractive disorders in children of Albino Brazzaville and to appreciate their impact on the visual acuity of these children.

## Patients and methods

### Patients

Our study was conducted at the University Hospital of Brazzaville in October 2018 as part of a special program of the Congolese Association of Albinos aimed at providing glasses free of charge to albino children.

### Method

This was a cross-sectional study of 32 children with oculocutaneous albinism.

All the selected children benefited from a complete ophthalmological examination. We used the best subjective corrected

visual acuity and performed a detailed anatomical examination. Ametropia was measured by cycloplegic autorefraction performed approximately 45-60 minutes after topical instillation of 3 drops of 1% cyclopentolate administered 5 minutes apart [3].

A second assessment of visual acuity was performed the next day with optical correction.

We used the WHO classification of visual impairment [4-6] taking the best corrected vision in the better eye into account:

- Mild Visual Impairment: Visual acuity between 6/12 and 6/18 (between 0.5 and 0.3)
- Moderate Visual Impairment: Visual acuity between 6/18 and 6/60 (between 0.3 and 0.1)
- Severe visual impairment: Visual acuity between 6/60 and 3/60 (between 0.1 and 0.05)
- Blindness: Visual acuity worse than 3/60 (less than 0.05)

Since visual impairment and blindness are defined by considering the visual acuity of the better eye, our work was done separately on both eyes [5].

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## Statistical analyses

We used EPI INFO 7 for statistical analysis. Comparisons were carried out using Excel software by performing equality tests on paired predictions in one eye and on unpaired predictions in both eyes after comparing variances. The confidence interval was 95%.

## Results

Our study included 12 boys and 20 girls, a sex ratio of 0.6. The average age was 12+/-3.06 (5 to 15 years old). All children had nystagmus, including 2 cases with strabismus (6.25%) (Table 1).

The mean uncorrected visual acuity in the better eye was 0.18+/-0.14. The mean corrected visual acuity in the better eye was 0.33+/-0.15. The improvement in corrected visual acuity was statistically significant  $P=0.002$ . The mean corrected visual acuity of the contralateral eye 0.25+/-0.15. The difference in the mean visual acuity of the two eyes was not statistically significant (Table 2).

## Discussion

Our study included 12 boys and 20 girls, a sex ratio of 0.6. Two Cameroonian studies Eballe and Aboubacar respectively found a sex ratio of 1.33 for men and 0.5 for women [7,8]. There is no gender predominance in albinism. these sex ratio variations, are probably random cases.

The average age in our study was 12+/-3.06 years old, which is consistent with the fact that we only worked with on patients with 15 years of age or less. In the literature, however, the average age is generally low, 18 for Gargouri in Tunisia, 24 and 13 for Aboubacar and Ebana in Cameroon [8-10]. The latter had evoked a low life expectancy among African albinos, which had already been demonstrated by Madelain [11]. Nystagmus was present in 100% of patients according to the literature [7-10,12].

Two children had a strabismus or 6.25%, this rate is a little lower than that findings in the literature. Khanal and Gargouri respectively found 16% and 13%. Strabismus affected 2 children out of 32, or 6.25% of cases. Khanal noted 16% of strabismus, and Gargouri 13.88% [9,12].

Astigmatism was present in all patients. No patient had isolated spherical ametropia. Spherical ametropia associated with astigmatism

were dominated by farsightedness which accounted for 56.25% of cases, against myopia with 37.5% of cases. Gargouri also found 100% astigmatism, associated with 59% hyperopia and 41% myopia [9]. Ebana found 86.7% astigmatism, 9.53% myopia and 2.38% Hypermetropia [10].

The mean uncorrected visual acuity in the better eye was 0.18+/-0.14 and corrected visual acuity in the better eye was 0.33+/-0.15 considering the best corrected vision. All patients had a visual acuity of 5/10 or less. These results are better than Cameroonian studies with mean corrected visual acuity of 0.15+/-0.08 for Eballe and 0.27+/-0.13 for Aboubacar. This is explained by the fact that they included only albinos who presented themselves in consultation. In contrast, in our series we selected patients amongst an albino association.

The visual acuity improvement provided by the optical correction was clinically significant. This improvement was also found by authors in the literature [7,13,14]

Although the average corrected visual acuity was greater than the better eye compared to the contralateral eye, the difference was not clinically significant. This makes it possible to evoke a symmetric disorder a priori.

These results allow us to classify patients according to their level of vision:

- All patients had visual impairment,
- Without correction only 25% reached 0.3 of visual acuity,
- With correction 53% had a visual acuity between 0.3 and 0.5,
- Despite the correction, 18.75% of children still had severe visual impairment or remained blind.

Gargouri reports 36% of patients with visual acuity greater than 3/10. Aboubacar also noted a maximum visual acuity at 0.5 [8,9].

## Conclusion

Albinism is associated with a variety of ocular anomalies including ametropia. Hypermetropic astigmatism was the most common refractive error identified in our series. Correction of this ametropia results in a statistically significant improvement in visual acuity. Despite this improvement, patients remain visually impaired. The patients must be optically corrected and be informed of realistic expectations.

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**Table 1.** Types of Ametropia

Types of Ametropia	Number of cases	%
Hypermetropia	0	0
Myopia	0	0
Simple Hypermetropic Astigmatism	8	25
Compound Hypermetropic Astigmatism	10	31.25
Mixed Astigmatism	2	6.25
Simple Myopic Astigmatism	0	0
Composed Myopic Astigmatism	12	37.5
Total	32	100

**Table 2.** Classification of patients based on visual acuity

	Uncorrected in the better eye	Corrected in the better eye	Corrected in the contralateral eye
No Visual Impairment	0 (0%)	0 (0%)	0 (0%)
Minimal Visual Impairment	8 (25%)	17 (53.13%)	10 (31.25%)
Moderate Visual Impairment	8 (25%)	9 (28.13%)	12 (37.5%)
Severe Visual Impairment	9 (28.13%)	4 (12.5%)	10 (31.25%)
Blindness	7 (21.88%)	2 (6.25%)	0 (0%)
Total	32 (100%)	32 (100%)	32 (100%)

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