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Original Research Article

Magnitude of refractive errors in primary school children

Théra JP[1], Théra B[2], Hughes D[3], Tinley C[3], Bamani S[4], Traoré L[4], Traoré J[4]
[1]Pediatric Ophthalmologist and Forensic Medicine Doctor, Faculty of Medicine / Institute of African Tropical Ophthalmology, Bamako (Mali)
[2]General Practitioner MD, Bamako
[3]Pediatric Ophthalmologist, Consultant CCBRT Hospital, Dar Es Salam (Tanzania)
[4]Professor, Department of Ophthalmology, Faculty of Medicine / Institute of African Tropical Ophthalmology, Bamako (Mali)

***Corresponding author**
Dr. Japhet Pobanou THERA
Email: therajaphet@yahoo.fr

Abstract: Refractive errors are leading cause of visual impairment and preventable blindness in children. In addition, they can lead to failure in school going children. 0ur study was carried out to determine the prevalence of refractive errors in primary school children of Koulikoro (Mali). A total of 1047 children of 6 to 15 years old were screened. The schools were selected using simple random sampling method. All the children were previously examined in classrooms. Children with visual acuity less than 0.8 in at least one eye were referred to our office for a comprehensive ophthalmic examination. The following results were obtained: Among the 1047 children, 14 had refractive errors. Children of 10 years old accounted for 20.1%, whereas children of 15 years old accounted for 1%. Myopia predominated with 43.36%, followed by astigmatism (38.46%), and hyperopia accounted for 18.18%.
Keywords: Magnitude, refractive errors, primary school children.

INTRODUCTION

Refractive errors or ametropias are defects in which refracted rays in the eye do not converge on the retina. They are classified as myopia, hyperopia and astigmatism [1]. Uncorrected refractive errors are an important cause of visual impairment and blindness worldwide [2, 3]. It is estimated that 1.4 million children are blind worldwide out of the total 45 million blind people. The prevalence of childhood blindness ranges to about 1.5/1000 in developing countries, whereas it is 0.3/1000 in well affluent countries [4]. The United Nations Children's Fund (UNESCO) defines childhood as the period from birth until 15 years of age. Every year between 1 and 2 million people, mostly women, become blind worldwide [5]. According to the World Health Organization (WHO), about 75% of causes of blindness can be avoided through preventive or therapeutic measures, regardless of age. Controlling childhood blindness is one of the priorities of the WHO through its program "VISION 2020: the Right to Sight" [6].The causes of childhood blindness vary and include corneal scarring, cataract, glaucoma, refractive error [4, 7]. In developed countries where health facilities are available, children are examined in early childhood, so refractive errors are diagnosed and treated as soon as possible. Conversely in developing countries, routine screenings are uncommon because of limited resources. Thus refractive errors are believed to be diagnosed late when patients are already impaired or even blind. The objective of this study was to determine the prevalence of refractive errors in school children.

MATERIAL AND METHODS

We carried out a cross-sectional study from October 2007 to December 2007 in a primary school of Koulikoro (Mali). We adopted an exhaustive screening; all the children who were in class at the moment of our study and whose parents consented prior to our screening were examined. The inclusion criteria were children of 5-15 years old. A total of 1047 children were screened. The visual acuity (VA) of each one was taken using a Snellen chart for distance vision. Those who had a VA less than 0.8 were selected and sent to our unit of ophthalmology for a comprehensive ophthalmic examination using streak retinoscopy, slit lamp examination, fundoscopy and optical correction under cycloplegic eye drops. The different refractive errors were: myopia, hyperopia and astigmatism.

RESULTS

A total of 1047 children aged 5-15 years were screened; among them, 143 had refractive error.

Children of 10 years old accounted for 20.1%, whereas children of 15 years old accounted for 1%. Males accounted for 51% (n=534) and females accounted for 49% (n= 513) with a sex ratio Male: Female = 1.04. Only 1 child was wearing spectacles at the time of screening. Myopia was prevalent with 43.36%, followed by astigmatism (38.46%), and hypermetropia accounted for 18.18%.

Table 1: Age distribution of the students

Age (years)	N	%
6	53	5.1
7	126	12.0
8	107	10.2
9	127	12.1
10	210	20.1
11	126	12.0
12	148	14.1
13	73	7.0
14	67	6.4
15	10	1.0
TOTAL	1047	100

Table 2: Distribution of refractive errors

Refractive error	N	%
Yes	143	13.6
No	904	86.4
TOTAL	1047	100

Table 3: Type of refractive errors

Refractive errors	N	%
Myopia	62	43.36
Hyperopia	26	18.18
Astigmatism	55	38.46
TOTAL	143	100

DISCUSSION

Among the 1047 children who were screened, 534 were males and 513 were females. The age of the students ranged from 6 to 15 years. In the study carried out by Carlos et al., the age of the patients ranged from 5 to 46 years. In our study, 147 students (13.6%147) were found to have refractive errors. This prevalence is greater than the one found by Mohammad in Saudi Arabia, 4.5% [8]. Medi *et al.;* found in Kampala, found a much greater prevalence of refractive errors than ours, 52% [9]. The increasing of refractive errors worldwide may relate to among others electronic devices such as phones, televisions (TV), and computers. Many children once they leave classroom spend most of their time watching TV or playing games on electronic devices.

Refractive error is an optical defect intrinsic to the eye which prevents the light from being brought to a single point focus on the retina, thus reducing normal vision [10] . In our study, females were more affected by refractive errors (65%); this is confirmed by many authors [11, 12]. Among the refractive errors, myopia was predominant with 43.36% (n=62), followed by astigmatism, 38.46% (n=55) then hyperopia, 18.18% (n=26). Our results corroborate the international publications which found myopia as the prevalent refractive error [13, 14]. Contrary to our result, Carlos in his study in Brazil found hyperopia as the predominant Refractive error, 71% whereas myopia accounted for 13.3% [1**]**. Among our screened children, only 1 was wearing spectacles at the time of screening. This condition denotes the lack of medical care in this group of children. Ideally, since boarding school, children have to undergo screening for refractive errors; because a good visual acuity is essential for success in studies.

Under corrected refractive error, particularly myopia is especially a problem in school children. Poor vision and the inability to read material written on the blackboard can have a serious impact on a child's participation and learning in class and this can adversely affect a child's education, occupation and socio-economic status for life [15]. An estimated 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive errors, of which 8 million are blind. Approximately 12.8 million children in the age group 5-15 years are visually impaired from uncorrected or inadequately corrected refractive errors, estimating a global prevalence of 0.96 % [16]. Refractive error contributes about 19% of the total blindness worldwide International Agency for the Prevention of Blindness (IAPB), both separately and in their joint initiative, VISION 2020: The Right to Sight, have worked very hard to put uncorrected refractive error on the blindness prevention agenda and to develop strategies for the elimination of this most simple avoidable cause of vision loss. Without appropriate optical correction, millions of children are losing educational opportunities [17].

CONCLUSION

Refractive errors are frequent among our screened children; myopia and astigmatism were prevalent. A regular screening of young school going children is necessary for early detection and management of refractive errors.

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