

Survey of Refractive Errors among Primary School Pupils in Sikasso

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Abstract

Original Research Article

Refractive errors (ametropias) are characterized by the inability of the eye to correctly focus the image of an object on the retina. We carried out a cross-sectional study from April 11 to April 30, 2018. The three-stage cluster survey was used, 750 first cycle students were examined in 30 schools of the fundamental cycle I (public, private and medersa sectors).) of the city of Sikasso. Of the 750 students examined, 85 ametropes were retained and studied, giving a prevalence of 11.3%. Among the ametropics: 49.41% of the hypermetropics; 44.70% of astigmatism and 5.88% of myopes. Associated pathologies were found in 23, i.e.27.1%. 91.30% of pathologies associated with ametropia were LCET followed by conjunctivitis 4.35%.

Keywords: Prevalence, ametropia, cyclopentolate, School, first cycle, city of Sikasso.

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I. INTRODUCTION

Refractive errors (ametropia) are characterized by the inability of the eye to correctly focus the image of an object on the retina [1]. The eye plays an important role in learning. In effect education being considered the pillar of development and growth, and one of the main means to improve the well-being of individuals [2], early impairment of visual function can interfere with child development and thus have an impact on their academic performance. The WHO estimates that 153 million people worldwide live with visual impairment due to uncorrected refractive error [3]. Ametropia is one of the five causes of preventable blindness in the world that the WHO and international non-governmental organizations have proposed to eliminate by the year 2020. These five problems have been identified as immediate priorities: trachoma, cataracts, onchocerciasis, refractive errors, childhood blindness [4].

Screening and early treatment can prevent certain complications that are detrimental to the

academic, social and professional future of affected children [5]. In Africa, studies have been carried out on ametropia. In Benin, a study carried out in 2005 on the prevalence of refractive errors among pupils of the public primary school of Cadjèhoun (Cotonou) found 10.6% [6]. In Cameroon, a study carried out in 2008 on eye pathologies frequently encountered in schoolchildren aged 6 to 15 showed a frequency of 43.1% for ametropia [7].

In Mali, in 2005, in the commune of Koulikoro, a study on the prevalence of refractive errors in the first cycle of basic education found an overall prevalence of 13.6% of ametropia [8]. In commune IV of the district of Bamako, a study carried out in 2007 on refractive errors in pupils aged 12 to 18 found a prevalence of 18.9% [9]. A study carried out in 2013, among first and second year students in the four schools of the rural commune of Sanankoroba found 3% of ametropia [10].

Refractive errors constitute a real public health problem in the world and in particular in Africa. Few studies have been carried out in the city of Sikasso on refractive errors. Hence the initiation of this work entitled investigation of refractive errors among first cycle schoolchildren in the city of Sikasso.

II. METHOD AND PATIENT

We carried out a cross-sectional study from April 11 to April 30, 2018 in 30 first cycle schools (public, private and medersa) and at Sikasso hospital. Were included, all the pupils registered in the establishments of the first cycle.

The probabilistic method was used with cluster sampling to select schools, classes and students. For sample size, we used the Schwartz formula; with an accuracy of 2%; a prevalence of 4% and a cluster effect of 2. We obtained a sample size n of $737.5 \approx 738$.

Cluster determination: Cluster sampling was used in 3 stages.

1st degree: choice of schools

Through the list and the number of all the public, private and medersa schools of the first cycle of the city of Sikasso, we had a cumulative number of 54,869 students from the 136 establishments. In accordance with WHO recommendations, we took a number of clusters equal to thirty. The sampling index (no sampling) was calculated by the formula: cumulative count over the number of clusters $54,869 \div 30 = 1829$

By choosing a random number between 1 and 1829 on the random number table, we got 283. 283 constitutes the 1st cluster and to determine the rest of the clusters.

2nd degree: the choice of classes in the chosen schools

After numbering all the classes in an establishment, we drew lots for five.

3rd degree: student choice.

The number of pupils retained per cluster was calculated by the following formula: the size of the sample over the number of clusters. The size of the sample being equal to $750 \div 30 = 25$. Thus 25 pupils in each school were selected, we randomly selected five pupils in each class.

The randomly selected students were examined at school. Those who had a visual acuity of less than 10/10 were dilated at school with cyclopentolate then automatic refractometry and optical correction in the event of ametropia. The other pathologies were referred to the hospital for treatment.

Tools and data collection: An individual survey form was used for data collection.

Classification of refractive errors

Hyperopia: Weak [+0.5 +2] Medium [+2 +5] Strong [+5 ∞ [

Myopia: Low [- 0.25 -3] Medium [-3 -6] High [-6 ∞ [

Astigmatism: Direct (0-30°) (180° -150°) Reverse (60° - 120°)

Oblique (30° - 60°) (120° - 150°)

Ethics

We had the consent of the parents of students and the consent of each selected student. The data collected was not used for any other purpose. Anonymity was guaranteed for each student surveyed.

Data analysis: Data were entered and analyzed in SPSS 20.

IV. RESULTS

Table I: Distribution of pupils according to sex

Sex	Effective	%
Feminine	360	48
Male	390	52
Total	750	100

The male sex represented 52% in our sample.

Table II: Distribution of students according to age group

Age Range	Effective	%
6-9	348	46.4
10-13	363	48.4
14-16	39	5.2
Total	750	100

Pupils aged 10 to 13 represented 48.4%.

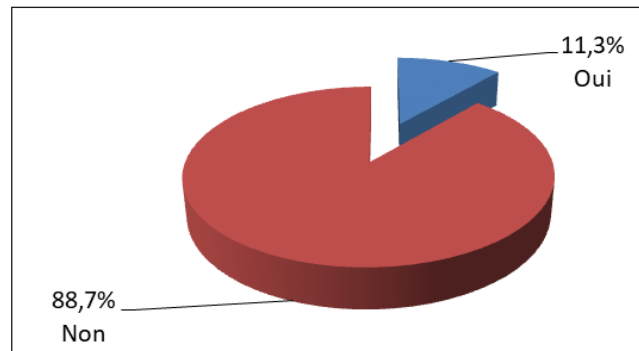


Figure 1: Prevalence of ametropia

Ametropia represented 11.3% in our sample with a confidence interval [9.1 – 13.8]

Table III: Distribution of ametropia according to the type of associated pathologies

Associated pathology	Ametropia		Total
	Yes	No	
LCET	21 (91.30%)	159 (85.94%)	180 (100%)
Cataract	0	2 (1.08%)	2 (100%)
Chalazion	0	2 (1.08%)	2 (100%)
Corneal pillowcase	0	1(0.54%)	1 (100%)
Conjunctivitis	1(4.35%)	16 (8.65%)	17 (100%)
Anterior staphyloma	0	2 (1.08%)	0
Subconjunctival hemorrhage	0	1 (0.54%)	0
Strabismus	1(4.35%)	0	1 (100%)
Total	23 (100%)	185 (100%)	206 (100%)

LCET accounted for 91.30% in ametropes.

V. COMMENT AND DISCUSSION

1. Overall prevalence of ametropia

Refractive errors accounted for 11.3% (n=85) of students aged 6 to 16 in the city of Sikasso. This prevalence of ametropia is close to that found by Sounouvou I in Cotonou [6] and Diallo O [9] in Bamako giving respectively 10.6% and 18.9%. On the other hand Traoré.I in Sanankoroba found a lower prevalence than ours with 3% [10]. However, higher frequencies than ours have been reported by: He M *et al.*, [11] in Guandzhou, China (50.8%); Maul E *et al.*, [12] in Santiago, Chile (56.3%); Ayed T and col [13] in Tunisia (57.2%). This difference could be explained by the different types of methodology adopted and the study population.

2. Sex

The male sex represented 52% and female 48%. We did not find a statistically significant difference. This was also observed by Diallo O [9].

3. Different types of ametropia

3.1. Myopia

Myopia was found in 5.88% (n=5) of ametropes. It was especially common among students in the age group of 6-9 years with 0.47%. Unlike other studies, we did not find an increase in the prevalence of myopia with age. Other surveys conducted have found results somewhat similar to ours: Leon BE [14] 2%;

Faderin MA [15] 9%. Diallo O [9] found that 38.7% of ametropes were myopes.

As for variability with sex; (0.23%) of myopes were female versus (0.35%) male. The difference is not significant. On the other hand, those of Théra B [8] are much higher than ours with 43.36% (n=62) with 67.7% girls and 32.3% boys.

3.2. Hyperopia

Hyperopia was the most frequent ametropia in our study with 49.41% (n=42) and 27% among students in the 6-9 year age group. 28% of hyperopes were female with a statistically significant difference (P=0.04). On the other hand, other surveys conducted have found results lower than ours: Thera B [8], S Matta [14], Diallo O [9] and S Sethi [16] who respectively found 18.18%; 16.9%; 14.8% and 11.2%.

3.3. Astigmatism

Astigmatism accounted for 44.70% (n=38); we have found 63.16% direct astigmatism; 23.69% inverse and 13.16% oblique. We did not find a statistically significant difference between age, sex and astigmatism. 60.53% of astigmatism was male versus 39.47% female. 52.63% of astigmatism were 10-13 years old. This prevalence is similar to that of Diallo O [9], Théra B [8], Traoré I [10], who found 46.5% and 38.46% respectively; 50%. On the other hand, Ayed T

[13] and Sethi S [16] found prevalences lower than ours with 16.4% and 20.4%.

4. Associated pathologies and ametropia

Associated pathologies were found in 23 ametropes either 27.1%. 91.30% of the associated pathologies were LCET followed by conjunctivitis 4.35%. These results are superior to those of Diallo O [9] and Théra [8] who found 72.17% and 70.1% of the LCET respectively.

VI. CONCLUSION

Refractive errors (ametropia) are common among undergraduate students in the city of Sikasso. It would be desirable to carry out a study on a regional scale to determine the prevalence of ametropia and the impact on school performance.

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