

Magnitude and pattern of significant refractive errors in primary school children of Lilongwe, an urban district in Malawi

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ABSTRACT

Objectives: To determine the prevalence and pattern of significant refractive errors in urban primary school children aged 12 – 15 years in Lilongwe.

Design: Cross sectional community based study

Setting: Six non boarding primary schools in three education zones in the urban Lilongwe district.

Subjects: All primary school pupils (1448) aged 12 to 15 years who were present during the study.

Results: The prevalence of significant refractive errors was 2.3%. Myopia accounted for 1.7%, hypermetropia 0.4% and astigmatism 0.3%. Only 9% of these had full spectacle correction.

Conclusion: There is low prevalence of significant refractive errors among primary school children in Lilongwe.

Recommendations: There is no justification for routine school screening in Lilongwe since the prevalence of significant refractive errors is low.

INTRODUCTION

Refractive errors are among the leading causes of visual impairment worldwide and according to a report by Fotouhi et al, are responsible for high rates of low vision and blindness in certain areas.¹ School children are considered a high risk group because refractive errors can seriously affect their learning abilities and their physical and mental development.² Studies on the prevalence of refractive errors among children in different parts of the world show significant differences and population based studies concerning refractive errors in children are very limited in southern Africa.^{3,4,5,6} In many developing countries including Malawi, there are no national preschool or school eye screening programmes and in most cases screening is done for the purpose of research. Little is known about the prevalence and public health importance of refractive errors in school age children. Effective management of visual impairment due to refractive errors requires the establishment of proper service structures to match the magnitude of the problem. The objectives of this study were:

1. To determine the prevalence of significant refractive errors in primary school children aged 12 to 15 years in the urban district of Lilongwe in Malawi respectively.
2. To determine the pattern of significant refractive errors in primary school children.

3. To determine the proportion of uncorrected significant refractive errors in primary school children.

MATERIALS AND METHODS

The study was conducted in October and November in 2007. Approval was granted by the Ministry of Education in Malawi. All children aged 12 – 15 years in the selected schools who were present during the study period were examined. Cycloplegic refraction (OR) was done on children with visual acuity of 6/12 or worse in the better eye, followed by subjective refraction the next day. Prescriptions were given to those pupils who needed spectacles.

Parents/Guardians gave consent for their children. Permission to conduct the study at a particular school was sought from the headmaster.

A case was defined based on the specific recommendations of the WHO refractive error working group as *a child with a significant refractive error if the visual acuity during the study period was 6/12 or worse in the better eye with the use of a Snellen's chart and was improving with refraction.*⁷ Those with visual loss due to other causes were excluded.

All data was analyzed using the SPSS version 12.0 statistical software and Epi info version 3.4.1.

The estimated minimum sample size was 830 pupils.

RESULTS

A total of 1,448 children were examined giving a response rate of 98.8%. 17 children were absent. Females comprised 52.5% of the study population. The mean age of the study participants was 13.0 (\pm 0.02) years with a standard deviation of 1.0 year. The age range was 12 – 15 years. The prevalence of significant refractive errors was 2.3% (33/ 1,448).

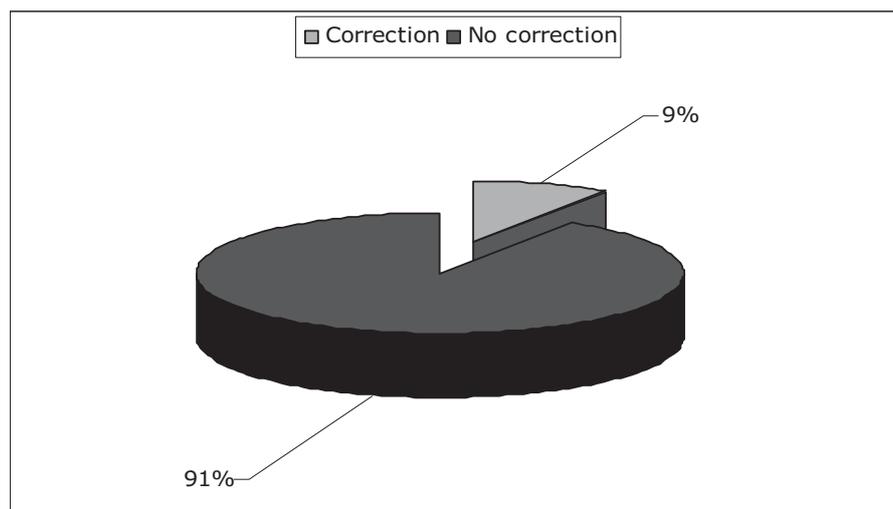
Table 1: Refractive Status of study population (n = 1,448)

Refractive Status	n (%)
Hypermetropia	6 (0.4)
Myopia	22 (1.7)
Astigmatism	5 (0.3)
Emmetropia	1415 (97.6)
Total	1,448 (100.0)

Table 2: Distribution of Significant Refractive Errors by age (n = 33)

Refractive status	Age in years				P-value
	12 yrs, n (%)	13yrs, n (%)	14yrs, n (%)	15yrs, n (%)	
Hypermetropia, n (%)	2 (18.2)	3 (25.0)	1 (16.7)	-	0.735
Myopia, n (%)	6 (54.5)	8 (66.7)	4 (66.6)	4 (100)	0.436
Astigmatism, n (%)	3 (27.3)	1 (8.3)	1 (16.7)	-	0.491
Total	11 (100)	12 (100)	6 (100)	4 (100)	

Fig 1: Spectacle correction amongst children with significant refractive errors (n = 33)



Only 3 out of the 33 children with significant refractive errors were wearing full spectacle correction.

DISCUSSION

The prevalence of refractive errors in this study population was 2.3%. This is comparable to the prevalence noted by Naidoo et al Durban, South Africa which was 2.9%.³ This is however much lower than the prevalence reported by Nzuki et al of 10% but much higher than what Wedner et reported in rural Mwanza primary school children (1%) in Tanzania.^{8,9} According to the Refractive Error studies in School Children (RESC), the prevalence of myopia is higher in China (18 – 49.7%) and Malaysia (24.8%) than in Nepal (2%), South Africa (2%), India (10%) and 10% in Chile.^{3,4,5, 6} The rigorous schooling system in China has been advanced as the cause of high refractive error prevalence, particularly myopia. The prevalence of myopia of 1.7% (Table 2) in Lilongwe compares well with that noted by Naidoo et al in school children in Durban, South Africa. They found prevalence of myopia to be 2%, though their age group ranged from 7 to 15 years.³ The definition used in this study may have resulted in underestimation of the prevalence of hypermetropia. Hypermetropes tend to accommodate, hence could have been able to read the 6/12 line with effort even with a huge refractive error and consequently missed as normal subjects in the study. Only 9% of the participants had spectacle correction (fig 1). Some were prescribed but could not afford to buy and the majority had not been seen at a health facility. It is also worth noting however that a myope with 6/12 is not severely handicapped, they can do close work for hours without any difficulty and sitting near the front would negate any difficulties they had with distance vision.

CONCLUSION

The prevalence of significant refractive errors in primary school children in Lilongwe as in other sub-Saharan African countries is too low to justify a regular school screening programme.

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