

Prevalence of refractive errors and eye disorders among primary school children in Al-Kut City, Wasit Governorate, Iraq

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Abstract

This study was designed to estimate the prevalence of refractive errors and other eye disorders among primary school children in Al-Kut city at Wasit Governorate, Iraq. In this population-based cross-sectional study of primary school children (age 6-12 years) a sample of 1000 children from 4 different primary schools of both sexes were selected. All schools were in Al-Kut city. Our team visited the selected schools and examined the children for presenting visual acuity followed by manifest refraction, external eye, anterior segment and posterior segment, and ocular alignment and motility. Positive cases were referred later to Al-Zahra Teaching Hospital, ophthalmology department for more comprehensive examination and management. Refractive errors include myopia, defined as a spherical equivalent (SE) of at least -0.50 Diopter (D), hypermetropia SE at least +1.0 D, and astigmatism at least 1.0 D cylinder. The prevalence of refractive errors was (20.7 %); myopia (16.3 %), hypermetropia (4.5 %), and astigmatism (10.0 %). Refractive errors are common in this age group. They were the main cause of visual impairment. Because they have a significant medical, social, and financial impact on society, early attention to this problem is important to avoid the long-term effects of amblyopia and poor school performance. It was concluded that our screening program is an effective strategy where all children enrolling in primary schools are examined compulsorily to eliminate this treatable cause of visual impairment.

Keywords: Refractive errors, myopia, hyperopia, astigmatism, eye disorders, children.

1. Introduction

Refractive errors (myopia, hypermetropia, and astigmatism) result in an unfocussed image falling on the retina. Uncorrected refractive errors, which affect persons of all ages and ethnic groups, are the main cause of visual impairment. Uncorrected refractive errors may result in lost education and employment opportunities, lower productivity, and impaired quality of life. They are the main cause of visual impairment in children aged from 5 to 15 years therefore services should focus on children and the correction provided must be affordable, of good quality and culturally acceptable [1, 2].

Even though refractive errors are responsible for major eye disease burden yet, diagnosis and treatment are one of the easiest ways to reduce impaired vision or even blindness. Clearly, access to eye care services, public awareness of the need for them, and availability of spectacles have not yet reached adequate levels. Refractive errors frequently remain undiagnosed for long periods. Correction of refractive errors and low vision are one of the priorities of global initiatives for Vision 2020 [3]. In Iraq there are few studies showing the prevalence of refractive errors. The present study is a preliminary survey to determine the prevalence of refractive errors and other eye disorders among primary school children in Al-Kut city, which is the urban center of Wasit Governorate, a major Iraqi governorate located 180 km. to the south Baghdad with a population estimated around 1 million people.

In developed countries, screening for eye diseases in preschool or school children has been carried out routinely even though there was an active debate regarding its value and cost effectiveness [4, 5]. Screening is mainly directed towards identifying children with amblyopia, strabismus, and refractive errors [6-9]. In Iraq a national screening program exists for children newly enrolling in primary schools but as in most developing countries lack trained personnel limits its implementation especially in areas outside the capital and major urban areas.

2. Objective

The aim of this study is to assess refractive errors and other eye disorders in primary school children in Al-Kut city at Wasit Governorate, Iraq.

3. Methods

The current study is a cross sectional descriptive study of a cluster random sample of four primary schools. During the academic year 2007 samples of 1000 children of both sexes were recruited. All schools were in Al-Kut city, the urban center of Wasit Governorate in Iraq. Our ophthalmological and optometrist team visited selected schools and examined the children in a room prepared for this purpose in each school with the cooperation of the school administration.

Examination included presenting visual acuity (unaided VA) using an "illiterate E" chart held at six meters from the child and examining each eye separately starting with the right then the left followed by manifest refraction to determine the type and amount of refractive error using a handheld streak retinoscope and a portable trial case of lenses. The external eye, anterior segment and posterior segment were examined using a direct ophthalmoscope and then ocular alignment and motility were tested.

Finally, a written questionnaire for relevant history points was filled in for each child. Positive cases were referred later to Al-Zahra Teaching Hospital, ophthalmology department for more comprehensive ocular examination including cycloplegic refraction and determining the corrected visual acuity and cases were managed accordingly including the prescription of eyeglasses. Myopia was defined as a spherical equivalent refractive error of at least -0.50 D, and hypermetropia as spherical equivalent refractive error of at least +1.00 D. A child was considered an emmetrope if neither eye was myopic or hyperopic, a myopic if either or both eyes had myopia, and a hypermetrope if one or both eyes had hypermetropia, as long as neither eye had myopia. A child was considered astigmatic if one or both eyes had a cylinder of at least 1.0 D.

4. Results

Sample includes one thousand children were selected. Only 897 children were examined. The overall participation rate was (89.7 %). 281 children had low vision in one or both eyes ($VA \leq 6/12$) and were referred to the hospital for comprehensive examination (31.3 %) as shown in figure 1. However, 186 children had a refractive error (prevalence 20.7 %). The distribution of refractive errors was as follows 146 cases had myopia (prevalence 16.3 %), 40 cases had hypermetropia (prevalence 4.5

%), and 90 cases had astigmatism (prevalence 10.0 %) as listed in table 1, as well as in figure 2. Moreover, other eye disorders we found strabismus (squint) in 15 cases (1.6 %), chronic blepharitis and allergic keratoconjunctivitis in 11 cases (1.2 %), and corneal opacity was observed in one eye of three children including one child with history of sharp eye trauma table 2.

Table 1: Prevalence and distribution of refractive errors.

Type of Refractive	Number of Cases	Prevalence
Myopia	146	16.3 %
Hypermetropia	40	4.5 %
Astigmatism	90	10.0 %
Total (Myopia and Hyperopia)	186	20.7 %

Table 2: Prevalence of other Eye disorders.

Eye disorders	Number of cases	Prevalence
Strabismus	15	1.6 %
CHR. Blepharitis and VKC	11	1.2 %
Corneal opacity	3	0.02 %

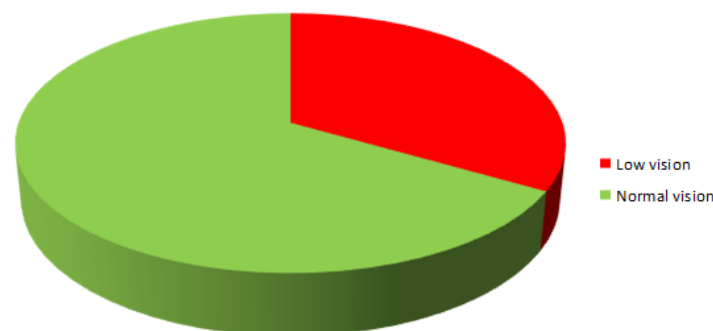


Figure 1: Prevalence of uncorrected low vision.

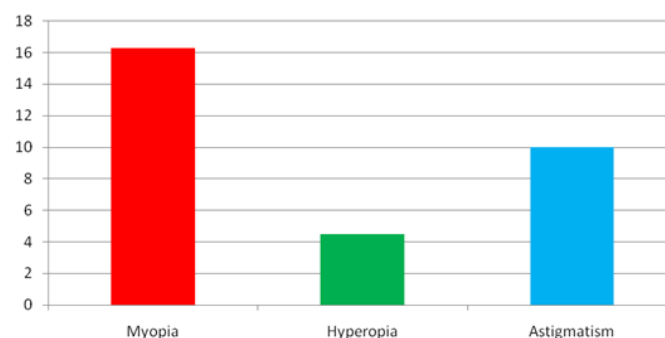


Figure 2: Prevalence of refractive errors.

5. Discussion

The results were based on a cross-sectional study of primary school children (age 6-12 years). The overall participation rate of (89.70 %) was good with cooperation of both school administrations and children's parents. Refractive errors are common among primary school children and are the leading cause of visual impairment. Most children did well with the "illiterate E" chart. Presenting visual acuity less than 6/6 in one or both eyes were found in 281 cases (31.3 %). This decreased with the use of spectacles. The prevalence of refractive errors was (20.7 %), mainly myopia. There is a relatively high prevalence of refractive errors among school children in Kut compared to studies from other neighboring countries. Different studies used different criteria to define low vision and refractive errors.

The current study is more inclusive, aiming to cover the larger scale problem and later categorize it according to significance. Close results were found in a similar study from Egypt where prevalence of refractive errors ($VA < 6/12$) among school children was (22.1 %) [10]. Another study from south Jordan showed that significant refractive errors causing $VA < 6/12$, strabismus and amblyopia were uncommon; each had a prevalence of less than (1 %) [11]. A study on school children from Dezful, Iran revealed that the uncorrected visual acuity was 6/12 or worse in the better eye of (3.8 %) of participants [12]. A study from Yemen showed that (13.9 %) of school children (age 7-13 years) had visual impairment ($VA < 6/6$) due to refractive errors [13]. Finally, a study from Turkey found the prevalence (11.0 %).

John Hopkins investigators reported that more than half of the black children (55 %) had some refractive errors as did half (51 %) of the 1,030 white children [14]. Special emphasis was made on finding hereditary factors. 42 % of cases gave a positive family history but since the written questionnaire data were scarce and inaccurate the decision was made to exclude it from the study. The differences may be due to racial or ethnic variations in the prevalence of refractive errors, especially the high prevalence of internal marriages among close relatives, or due to different lifestyles or living conditions. These findings imply that differences in lifestyle (reading, watching television), living conditions such as nutrition, or medical care may be major factors beside racial or ethnic differences. There are many factors that need to be considered when deciding whether to introduce an eye-screening program in children. These include the prevalence and health, educational, or work impact of

poor vision within the population, the human and financial resources available for screening, the cost effectiveness of the screening and the treatment given, and the availability and compliance with any treatment offered.

As no study regarding the cost effectiveness of children screening programs for eye disease has been reported from developing countries, any judgments related to whether to introduce a screening program will be necessarily subjective. Mathematical simulation model for uncorrected refractive error, using prevailing prevalence and incidence rates and cost-effectiveness of screening and correcting refractive errors in school children in Africa, Asia, America, and Europe. In all regions, screening from 5 to 15 years old children yields most health effects, followed by screening from 11 to 15 years old, 5 to 10 years old, and screening from 8, to 13 years old.

In all regions, screening from 11 to 15 years old is the most cost-effective intervention [15]. Other common eye disorders found were strabismus (1.6 %) mostly related to refractive error and uncorrected low vision due to delayed presentation and noncompliance with spectacle wearing by parents and limited availability of ophthalmological services. Vernal keratoconjunctivitis and chronic blepharitis (1.2 %) these two conditions can be difficult to differentiate from each other and often coexist are common in Iraq due to genetic factors and environmental conditions the hot dry, dusty weather, and the low hygiene.

They are a major cause of symptoms and medical care seeking. Corneal opacity is common in the third world due to trachoma and infectious keratitis or trauma which frequently has delayed presentation and undertreated still is a major problem especially in rural areas. Other eye disorders apart from above were not found may be due to the low sample size and the fact that children with severe visual impairment may be admitted to schools for children with special needs or not at all such as bilateral congenital glaucoma, congenital cataract, hereditary fundus dystrophies and vitreoretinal degenerations. The study did not include the rural areas of the governorate which may have more eye problems due to lower socioeconomical status and limited access to medical facilities. Larger multicenter studies are advisable to address this issue including different districts of the governorate.

6. Conclusion

Refractive errors are common in this age group. They were the main cause of visual impairment. Because they have a significant medical, social and financial impact on society, early attention to this problem is important to avoid the long-term effects of amblyopia and poor school performance. It was concluded that preschool screening programs are an effective strategy where all children enrolling in primary schools are examined compulsorily to eliminate this treatable cause of visual impairment.

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