

Screening for Visual Impairment among Primary School Students in Baghdad Al-Karkh

Najlaa Fawzi Jamil

Basma Abdul Razzaq Atta

MBChB, MSc, FICMS

MBChB

Abstract

Background: Visual impairments are well-known to effect school student's academic performance along with their quality of life. On encouraging note, visual impairments can be well managed if they are detected early by visual screening.

Objectives: To assess the visual acuity of the primary school students and to find out the prevalence of visual impairment (VI) along with description of some characteristics of visually impaired students.

Subjects and method: A cross-sectional study was conducted among governmental primary schools students in Baghdad/ Al-Karkh from 1st of Dec 2016 to the end of April 2017. The data was collecting by structural questionnaires to obtained information about some socio-demographic and health risk factors. Vision screening was performed by Snellen E-chart to assess the visual acuity (VA) of study participants.

Results: The total number of students enrolled in the study was 2104. Visual acuity of 6/6 was the most frequent measure, in the right eye was (69.49%) and the left eye was (69.96%). The prevalence of visual impairment (VI) among the study group was 5.4%, boys and girls have the same rate (50%) of VI. Refractive error could be the main reason of visual impairment (83.3%) according to the pinhole test results. The highest rate of VI (62.4%) was detected among students in age group (10-12) years and in grade 4th and 5th students (23.7%). 56.1% of visually impaired students had a family history of wearing glasses. Visual impairment was more prevalent among students spent more than two hours in studying and reading books 71.1%, while only 28.1% who watched TV for more than 3 hours had VI.

Conclusion: Early and periodic eye examination for school-aged children is recommended. As well as students, parents, and teachers must be educated about the early detection of VI and correction with eyeglasses to prevent progression of visual impairment.

Key words: Visual acuity, prevalence, visual impairment, primary schools, Baghdad/ Al-Karkh.

Introduction:

The visual system is one of the most important sensory systems. It plays a vital role in a child integration with the external environment.^[1]

According to WHO, it is estimated that 19 million children in the age group 5–15 years are visually impaired worldwide with a global prevalence of 0.96%, out of which 12million are as a result of uncorrected refractive errors.^[2]

Visual impairment in childhood has lifelong insinuation for both the children and their families. It disturbs the child's development, education, and the care given by families and professionals. Visual impairments have cognitive, academic, social and emotional, and behavioral effects, as well as it had negative effects on quality of life^[3,4]

In most cases children's vision problems can be easily detected by simple vision tests (such as visual acuity screenings). The main purpose of screening and surveillance for visual defects throughout childhood is the early detection and treatment of relevant ophthalmic disorders, to minimize their impact on a developing child and encouraging them to take corrective measures in the form of spectacles can therefore play an important role in preventing long-term visual disability^[5,6]

The objectives of the study were to assess the visual acuity of the primary school students in Baghdad/Al- karkh and to estimate the prevalence of visual impairment (VI) along with description of some characteristics of visually impaired students.

Methodology:

Cross-sectional design was carried out on a sample of fifteen governmental primary schools from Baghdad Al-Karkh Educational Directorate for the period from 1st of Dec 2016 to the end of April 2017. A convenient non-probability sampling technique had been used to selection of schools.

Among the selected schools, one class had been chosen from the grades (2nd - 6th). The students of the selected classes were provided with written consent form to obtain the permission of their parents to participate in the study.

Students, who were absent, didn't bring the written consent or their parents refused their participation in the study were excluded.

A total 2250 consent letters and questionnaire form had been distributed to the students of the fifteen primary schools hired for the study. 2104 students returned them making the response rate 93.5%. Accordingly, the final number of students subjected to the vision examination was 2104 students.

The study had incorporated two parts, first part includes a structured questionnaire which contains questions concerning the student personal data, family history of wearing glasses. In addition, to questions about the hours spent by the student in studying, watching TV per day. Also, the questionnaire included questions to explore history of eye problems of the child such as, injuries or trauma, and headache. Finally, the parents were

asked about whether their child had eye glasses and if he/or she is wearing them or not.

Second part consists of the visual acuity assessment using the Snellen E-chart at 6 meters distance at school yard, under normal daylight lighting. Any student achieved less than 6/18 in one or both eyes was categorized as visually impaired [7] and he or she was furtherly subjected the pinhole test to appraise the improvement of visual acuity. [8,9]

The data was entered and analyzed using the available computer software facility of SPSS-24. Prevalence was calculated as number of students with visual impairment out of total screened students. Frequency distribution, and graphs were used to present data.

Results:

A total of 2104 students enrolled in the present study were submitted to visual acuity assessment their age range from (7-15) years.

69.49% and 69.96% of students presented with normal visual acuity (6/6) in right and left eye respectively. Among those with visual acuity (less than 6/18), 3.93% was detected in right eye and 3.04% in left eye. Table-1.

Figure- 1: 114 (5.4%) students were categorizes as visually impaired according to WHO cutoff point. Consequently, the prevalence of visual impairment among the study group was 5.4%.

Table- 1: The visual acuity assessment of 2104 students.

		No.	%
Visual Acuity Right Eye	6/6	1462	69.49
	6/9	333	15.83
	6/12	123	5.85
	6/18	103	4.90
	6/24	53	2.52
	6/36	16	0.76
	6/60	7	0.33
	CF*	5	0.23
	HM*	2	0.09
Visual Acuity Left Eye	6/6	1472	69.96
	6/9	390	18.54
	6/12	95	4.52
	6/18	83	3.94
	6/24	50	2.38
	6/36	7	0.33
	6/60	7	0.33

*CF (Counts Fingers), *HM (Hand Movement)

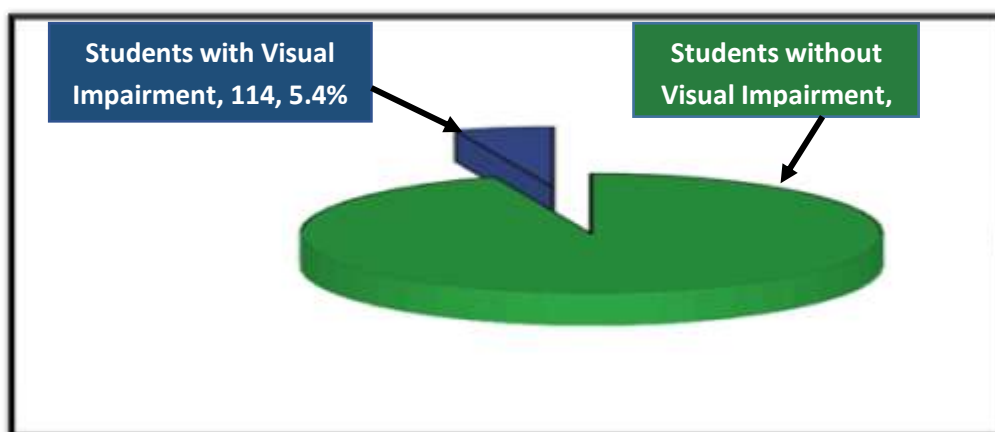


Figure- 1: The prevalence of visual impairment among study group.

Figure- 2: Represents the results of pinhole test performed for 114 students with visual impairment (VA<6/18), 95 (83.3%) of them had improvement in VA to better than 6/18 with pinhole test, this would suggest the cause might be refractive error.

Table- 2: Demonstrates some characteristics of 114 students with visual impairment. Boys and girls have the same rate (50%) of VI. The highest rate (62.4%) of VI detected among students in age group (10-12) years. The proportions of students

with visual impairment were likely to be gradually increased with school progression. It was 11.4% among those in the 2nd grade while it was about twice (23.7%) in those students from the 4th and 5th grade.

In response to family history of wearing glasses, 64 (56.1%) of the visually impaired students had positive family history of wearing glasses.

Out of 114 visually impaired students, 81(71.1%) of them spent more than two hours in studying, while 28.1% watched TV for more than 3 hours. (Table- 3)

Table- 4: Of 114 students with visual impairment, 48.2% of parents stated that their child had eyeglasses. During the eye exam, the majority of them (83.6%) were wearing their eye glasses.

6(5.3%) of visually impaired students had history of eye injury or eye diseases.

Among visually impaired students 12 (10.5%) and 45(39.5%) were complained from redness of eye and recurrent attacks of headache respectively.

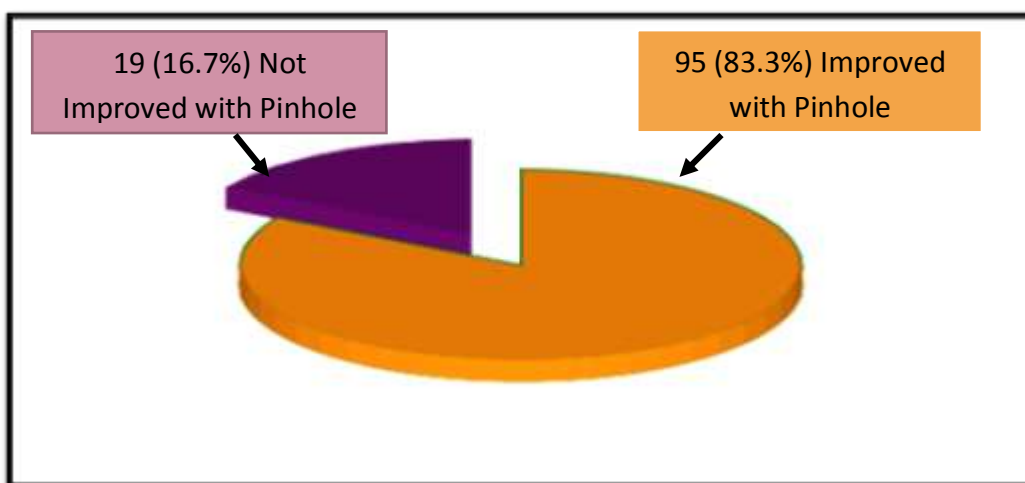


Figure- 2: Distribution of students with visual impairment according to pinhole test results. N=114

Table- 2: Distribution of students with visual impairment according to their personal characteristics. N=114

Variables		Visually impaired students	
		No.	%
Gender	Boy	57	50.0
	Girl	57	50.0
Age (years)	7-9	38	33.4
	10-12	71	62.4
	13-15	5	4.4
Grade level of student	2nd class	13	11.4
	3rd class	24	21.1
	4th class	27	23.7
	5th class	27	23.7
	6th class	23	20.2

Table- 3: The distribution of visually impaired students according to the (family history of wearing glasses, duration of studying and watching TV)

		Visually impaired students	
		No.	%
Family member wearing glasses		64	56.1
Hours spent in studying and reading books	Less than 2 hrs.	33	28.9
	More than 2 hrs.	81	71.1
Duration of watching TV	Less than 3 hrs.	82	71.9
	More than 3 hrs.	32	28.1

Table- 4: The distribution of visually impaired students according to the uses of glasses and the history of eye problems. N=114

		Visually Impaired Students	
		No.	%
Student have eye glasses	Yes	55	48.2
	No	59	51.8
Student wearing glasses	Yes	46	83.6
	No	9	16.4
History of eye injuries or eye disease	Yes	6	5.3
	No	108	94.7
Complaining of redness of the eye	Yes	12	10.5
	No	102	89.5
Complaining of recurrent headache	Yes	45	39.5
	No	69	60.5

Discussion

The prevalence of VI in this study was found to be (5.4%). A similar study in Sudan reported an equivalent rate of 5.5%^[10]

This rate of VI was more or less analogous to many studies accomplished in some countries such as: in Brazil, West Bangal, Jordan and Kenya^[11-14]. While other studies reported lower prevalence of VI among primary schools' students compared to the current study, such as studies from Iran, Turkey and Ethiopia^[15-17]

Conversely, there were also several studies publicized higher rates of VI among school children such as: Egypt, Qatar, Saudi Arabia and Vietnam^[18-21].

Aforementioned studies, show great dissimilarity in rate of VI and this may be due to many factors, one of which is the difference in the operational definition of low vision and using different cut off points to determine visual impairment, while other factors may be due to real variation in prevalence of VI allocated to genetic factors, socioeconomic states, geographical locality and other environmental influences between the various studies.

In current study the outcome of pinhole test predicted that refractive error as the main cause of visual impairment among the study group, since, 83.3% of the visually impaired students show improvement in their vision. This result was in line with studies carried out in China, Nigeria and Kenya which cited that RE was accounting for 86.08%, 84.6%, and 81.08% of the total causes of visual impairments among primary school students^[22, 23,14]

Such high rate of RE might be interrelated to that children with RE are less opportune for correction until they are significantly visually impaired and have difficulty performing particular visual tasks before they are brought for an eye examination. Thus systematic eye screening program in schools will help in prompt detection and correction of refractive errors^[24].

The result of the current study exhibited that both genders were equally affected, this finding was in parallel with the results from previous studies

conducted in China, Kenya, Sudan and Ethiopia^[22,14,25,17]

Furthermore, the present study results showed the rate of visual impairment becomes higher with increasing age and progress in school as those from grades 4th and 5th were the most affected. This result was in keeping with finding by earlier study conducted in Kenya which stated that age category most affected by visual impairment was (11-15 years) and the school grade utmost affected by visual impairment was class 5-6^[14]. The possible explanation is that attending high-grade in schools commonly go along with more hours of near work spent on homework per day due to higher degrees of educational attainment and greater educational pressures, all might increase the risk of visual impairment among those students.

Family history of wearing eye glasses found to be more common among visually impaired students, this finding was in agreement with the previous studies carried out in Gabon and Ethiopia stated that the risk of inheriting impaired visual acuity was increased if parents had comparable problems^[26,17]

This can be explained as families usually share the same social, environmental influences, nutrition, culture and education besides the genetic makeup. For that reason, family history of eye problems together with eye exams for children is very important to detect vision problems as early as possible.

In regard to near-work, the results found that the rate of visually impaired students more among students who spent less than three hours watching TV per day, this was compatible to previous study done in India^[12].

About half of the children whose parents reported them as having glasses, did not use them and the rate of VI was higher in students with glasses. This evidence was widely observed by some studies carried out in China^[27,28]. This result can be explained partly by that fewer periodical visual examinations were conducted for students wearing glasses, or the glasses worn were not appropriate for vision correction, which may be due to the poor quality of spectacles or a failure to update prescriptions.

Conclusions: The study results highlight the necessity for early and periodic eye screening among primary

school students in order to detect visual impairment early and provide proper management.

References:

- Gilbert C, Foster A. Childhood blindness in the context of VISION 2020-the right to sight. Bull World Health Organ, 2001; 79:227-232.
- WHO. Visual impairment and blindness. World Health Organization; 2014. Fact sheet 282. Accessed at 2/5/2017. <http://www.who.int/mediacentre/factsheets/fs282/en/>
- Rahi JS & Cable N. Severe visual impairment and blindness in children in the UK. Lancet, 2003; 362:1359-1365.
- Chadha RK & Subramanian A. The effect of visual impairment on quality of life of children aged 3-16 years. British Journal of Ophthalmology, 2011; 95(5):642-645.
- WHO. Sight test and glasses could dramatically improve the lives of 150 million people with poor vision, 2006. Available from: <http://www.who.int/mediacentre/news/releases/2006/pr55/en/>
- Neeti R, Yogesh U, Devender K. Screening for visual impairment: Outcome among schoolchildren in a rural area of Delhi. Indian J Ophthalmol, 2012; 60(3): 203-206.
- WHO. International Statistical Classification of Diseases and Related Health Problems. 10th revision. Current version. Chapter VII. H53-H54. Blindness and low vision, 2016. Available from: <http://apps.who.int/classifications/icd10/browse/2016/en/#/>
- Kassa T and Alene GD. Prevalence of refractive errors in pre-school and school children of Debarq and Kola Diba towns, North-western Ethiopia. Ethiop. J. Health Dev, 2003; 17(2): 117-124.
- Ovenseri-Ogbomo GO & Omuemu VO. Prevalence of refractive error among school children in the Cape Coast Municipality, Ghana. Clinical Optometry, 2010; 2:59-66.
- Zeidan Z, Hashim K, Muhit MA and Gilbert C. Prevalence and causes of childhood blindness in camps for displaced persons in Khartoum: Results of a household survey. Eastern Mediterranean health journal, 2007; 13(3):580-585.
- Salomão SR, Cinoto RW, Berezovsky A, Mendieta L, Nakanami CR. Prevalence and causes of visual impairment in low-middle income school children in Sao Paulo, Brazil. Invest Ophthalmol Vis Sci, 2008; 49(10):4308-4313.
- Mondal K, Mann N, Dasgupta U, Chakraborty A, Biswas S and Mundle A. A Study of Visual acuity among the students in a Rural Girls High School of West Bengal, 2013; 10(2):12-16.
- Ereifej I. Causes of Poor Vision among School Children and the Importance of Screening Programs in Jordan. Middle East Journal of Nursing, 2012; 6(2):15-18.
- Barasa E, Otieno SA and Karimurio J. The prevalence and pattern of visual impairment and blindness among Primary School pupils in Kitale Municipality, Kenya. Journal of Ophthalmology of Eastern Central and Southern Africa, 2013; 17(2):66-70.
- Fotouhi A, Hashemi H, Khabazkhoob M & Mohammad K. The prevalence of refractive errors among schoolchildren in Dezfoul, Iran. Br J Ophthalmol, 2007; 91:287-292.
- Unsal A, Ayranci U and Tozun M. Vision screening among children in primary schools in a district of western Turkey: epidemiological study. Pak J Med Sci, 2009; 25(6):976-981.
- Darge HF, Getahun Shibru G, Mulugeta A and Dagnachew YM. The Prevalence of Visual Acuity Impairment among School Children at Arada Subcity Primary Schools in Addis Ababa, Ethiopia. Journal of Ophthalmology, 2017; 7pages.
- El-Bayoumy BM, Saad A, Choudhury AH. Prevalence of refractive error and low vision among schoolchildren in Cairo. East Mediterr Health J, 2007; 13:575-579.
- Bener A and Al-Mahdi HS. Internet use and television viewing in children and its association with vision loss: a major public health problem. Journal of Public Health in Africa, 2012; 3(16):65-69.
- Aldebasi YH. Prevalence of correctable visual impairment in primary school children in Qassim Province, Saudi Arabia. Journal of Optometry, 2014; 7(3):168-176.
- Paudel P, Ramson P, Naduvilath T. Prevalence of vision impairment and refractive error in schoolchildren in Ba Ria - Vung Tau province, Vietnam. Clin Exp Ophthalmol, 2014; 42(2):217-226.
- Pi LH, Chen L, Liu Q, Ke N, Fang J, Zhang S, Xiao J, Ye WJ, Xiong Y, Shi H, Zhou XY and Yin ZQ. Prevalence of Eye Diseases and Causes of Visual Impairment in School-Aged Children in Western China. J Epidemiology, 2012; 22(1):37-44.
- Opubiri I and Pedro-Egbe. Screening for refractive error among primary school children in Bayelsa state, Nigeria. Pan African Medical Journal, 2013; 14:74.
- Balarabe AH, Adamu I and Abubakar A. Vision screening to detect refractive errors in three selected secondary schools in Birnin Kebbi, North West, Nigeria. Sahel Med J, 2015; 18 (2):61-65.
- Alrasheed SH, Naidoo KS, Clarke-Farr PC. Prevalence of visual impairment and refractive error in school-aged children in South Darfur State of Sudan. Afr Vision Eye Health, 2016; 75(1)
- Ategbro S, Koko J, Ngoungou EB, Kuissi E, Tchabpou CM. Study of Vision Problems in Schools in Libreville and Owendo, Gabon. Open Journal of Pediatrics, 2014; 4:300-306.
- Ma Y, Qu X, Zhu X, Xu X, Zhu J. Age specific prevalence of visual impairment and refractive error in children aged 3-10 years in Shanghai, China. Invest Ophthalmol Vis Sci, 2016; 57(14):6188-6196.
- He M, Zeng J, Liu Y, Xu J & Pokharel J. Refractive Error and Visual Impairment in Urban Children in Southern China. Investigative Ophthalmology & Visual Science, 2004, Vol.45, 793-799.