

Assessment of Visual Acuity among Children at Primary School Entry's Medical Exam in Al Karkh Side of Baghdad, Iraq

Rafal R Mahmood* MBChB, Khulood Oudah Abodaka** MSc, Faris Hassan Al Lami** PhD

ABSTRACT

Background: Eye health and the ability to see is considered the most significant sense in humans and a burden if lost. Vision screening for school-aged children helps in early detection, timely introduction of interventions, therapy, and health promotion for many eyes diseases.

Objectives: To assess the prevalence of visual impairment in children and explore the associated variables.

Methods: Descriptive cross-sectional study conducted at six primary health care centers in Baghdad Al-Karkh, for a period of 3 months. All children aged 5.5-6.5 years old attending the selected primary health care centers for the routine school-entry examination were included. The data were presented in frequency and percentage. Chi-square test was performed to assess the statistical association between the variables.

Results: Thirty-four (3.4%) of the sample had an impaired visual acuity examination. Of them, 32 (3.2%) had moderate visual impairment, and 2 (0.2%) had severe visual impairment of at least one eye. A significant statistical association was seen between impaired visual acuity test with residency, fathers' and mothers' educational levels,

Conclusion: Media campaigns should be directed to families for the simple methods of detecting impaired visual acuity in small children.

Keywords: Visual acuity, School-aged children, School entry medical exam.

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Vision is essential, as eye health and the ability to see is considered the most significant sense in humans and definitely a burden if lost, yet according to 2020 estimates, around 596 million people had distance vision impairment, of whom 43 million were blind⁽¹⁾ almost half of these cases could have been prevented or restored⁽²⁾. Though most people with vision impairment and blindness are between the age of 50 years and older, yet vision impairment and loss can occur at all ages, it had been reported that women, those living in rural areas, and minority groups are more vulnerable to vision impairments^(1,2). Visual impairment in children is severe public health, social, and economic problem worldwide⁽³⁾.

Children of those vulnerable groups might have the double risk as visual impairment among school children is so prevalent that a considerable number of children are suffering from some form of refractive errors, which could be easily corrected by the application of appropriate glasses. According to the WHO, the leading causes of vision impairment and blindness are uncorrected refractive errors and cataracts⁽²⁾.

On a social basis, a child with vision problems has restrictions in networking with his/her surroundings, the child won't see the facial expressions of teachers or parents, he or she won't be able to perceive the behaviors, and even unaware of others until they make a sound which further adds a burden and increase disability⁽³⁾. Vision screening for school-aged children helps in early detection, timely introduction of interventions, therapy, prevention, and health promotion for many eye diseases,

*Iraqi-Field Epidemiology Training Program, Iraqi Ministry of Health and Environment, Baghdad, Iraq. Email: altalibrarafal@gmail.com

**Dept. of Community and Family Medicine, College of Medicine, University of Baghdad, Iraq.

such as cataracts, glaucoma, and retinal detachment⁽⁴⁾.

It's well known that vision impairment reduces mobility, and increases the likelihood of falls and road traffic crashes, consequently, it increases the need for social care. Thus, it poses an enormous global financial burden, latest prevalence figures for 2020 propose a loss of productivity cost that reaches up to 410 billion US dollars per year⁽¹⁾. Adding to that the anxiety, depression, and social stigma effects per individuals and the influence on their families up to pressing the country's health resources and economy⁽⁵⁾.

By 2050, population aging, growth, and continuous urbanization would cause 895 million people with distance vision impairment, of whom 61 million will be blind. Thus, action to prioritize eye health is highly needed now⁽¹⁾ and must start as early as possible. In Iraq, vision screening of all children at school entry has been a traditional practice for many years, and it is a valuable method for identifying potentially treatable visual abnormalities. The results of this screening system are reported annually to the Ministry of Health. Though data are limited, yet according to the national records, 3.5% had visual impairment, 0.8% had severe visual impairment, while blindness was seen in 0.2% of the surveyed population⁽⁶⁾.

The aim of the current study is to assess the prevalence of visual impairment among children at school entry exam at PHCs in Baghdad Al Karkh and to identify some potential factors of visual impairment among the study group.

Methods

A cross-sectional study that was carried out at six randomly selected primary health care centers (PHCCs) from six primary health care districts in Baghdad Al-Karkh, during the period from 15th of August to 15th of October 2018. A random sampling technique was used, from a total list of schools for each PHC; (a total of 70 schools), One-third of schools (23) were

selected randomly and included in the sample

All children aged 5.5-6.5 years old attended the selected PHCs and selected schools for the routine examination as a requirement for entry to primary school.

Data collection was done using a structured questionnaire. The researcher interviewed parents and examined children attending the selected PHCs for the routine examination as a requirement for entry to primary school with the help of paramedic staff (refractionist) who performed the clinical examination in a six meter room with good illumination, Snellen chart was used for detection of visual acuity. Each child classifies according to the International Classification of Diseases 11 (2018) which classifies vision impairment into two groups, distance, and near-presenting vision impairment⁽²⁾.

Distance vision impairment:

- Mild: visual acuity worse than 6/12 to 6/18.
- Moderate: visual acuity worse than 6/18 to 6/60.
- Severe: visual acuity worse than 6/60 to 3/60.
- Blindness: visual acuity worse than 3/60.

Near vision impairment:

- Near visual acuity worse than N6 or M.08 at 40 cm.

Children whose visual acuity was worse than 6/18 (in one or both the eyes and those who fail in the depth perception test were referred to the eye clinic in a tertiary hospital for a detailed eye examination

The statistical package for social science (SPSS) version 20 program was used for data entry and analysis. The data were summarized and presented as frequency and percentage with 95% confidence interval. The chi-square test was performed to assess the statistical association between variables and Fisher test was used when chi-square was not applicable. In all statistical analyses, a p value ≤ 0.05 was considered to be significant.

Results

Out of 1018 approached children, 1011 responded to the questionnaire and agreed on participating in the study.

The mean age for the studied sample was 6.02 ± 0.14 years. Half of the studied sample were males, table 1 shows the sociodemographic characteristic of the studied sample.

The majority of the studied sample 989 (97.8%) didn't wear glasses, yet 22 (2.2%) with were using them. Approximately, three-quarters 735 (72.7%) of the sample had no family history of spectacles use. Table 2 shows the distribution of the studied sample according to the number of family members who were using spectacles at the time of the study.

Majority of the studied sample 977 (96.6%) had normal visual acuity examination for both eyes with a 95% confidence interval (95.5 – 97.7), and 34 (3.4%) of the studied sample had an impaired visual acuity examination of at

least one eye with 95% confidence interval (2.3 – 4.5). Out of those, 32 (3.2%) of the children had moderate visual impairment of at least one eye with a 95% confidence interval (2.1-4.3), and 2 (0.2%) had severe visual impairment of at least one eye with 95% confidence interval (0-0.5). Table 3 displays the results of the visual acuity examination for each eye in the sample. The majority 813 (80.4%) of the sample had normal right-eye visual acuity, and 818 (80.9%) had normal left-eye visual acuity.

Table 4 shows the association between impaired visual acuity and sociodemographic characteristics, past medical, family history, and habits among the studied sample. A statistical association was seen between having impaired visual acuity test and the area of residency, fathers' and mothers' educational level.

The study failed to show a significant statistical association between impaired visual acuity and hours spent watching television, but a significant statistical association was observed with hours spent using smart screens.

Table 1: Distribution of the studied sample by sociodemographic characteristics and parents' educational level.

Sociodemographic characteristic		Frequency	Percentage
Gender	Male	529	52.3
	Female	482	47.7
Residency	Al Yarmook	119	11.8
	Hai Al Jamiaa	161	15.9
	Al Dora	90	8.9
	Al Muwasalat	142	14.0
	Al Jamaiyat	275	27.2
	Al Zahraa	224	22.2
Fathers' Educational level	Illiterate	22	2.2
	Read and write	31	3.1
	Primary	234	23.1
	Secondary	373	36.9
Mothers' Educational level	Higher education	351	34.7
	Illiterate	21	2.1
	Read and write	51	5.0
	Primary	316	31.3
	Secondary	399	39.5
	Higher education	224	22.2

Table 2: The distribution of respondents according to the number of family members who were using medical spectacles, (n= 1011).

Number of family members who wore spectacles	Frequency	Percentage
0	735	72.7
1	216	21.4
≥ 2	60	5.9

Table 3: Distribution of the studied sample according to visual acuity examination for each eye.

Visual acuity	Right eye		Left eye	
	Frequency	Percentage	Frequency	Percentage
6/6	813	80.4	818	80.9
6/9	147	14.5	138	13.6
6/12	17	1.7	24	2.4
6/18	7	0.7	10	1.0
6/24	21	2.1	15	1.5
6/36	5	0.5	5	0.5
6/60	1	0.1	1	0.1

Table 4: The association between impaired visual acuity and sociodemographic characteristics among the studied sample.

Sociodemographic Characteristics		Normal visual acuity	Impaired visual acuity	P Value
Gender	Male	511(96.6%)	18(3.4%)	N.S* 0.942
	Female	466(96.7%)	16(3.3%)	
Residency	Al Yarmook	118(99.2%)	1(0.8%)	0.000
	Hai Al Jamiaa	267(97.1%)	8(2.9%)	
	Al Dora	89(98.9%)	1(1.1%)	
	Al Muwasalat	139(79.9%)	3(2.1%)	
	Al Jamaayat	161(100%)	0	
	Al Zahraa	203(90.6%)	21(9.4%)	
Fathers' educational level	Illiterate	18(81.8%)	4(18.2%)	0.001
	Read and write	29(93.5%)	2(6.5%)	
	Primary	221(94.4%)	13(5.6%)	
	Secondary	364(97.6%)	9(2.4%)	
Mothers' educational level	Higher education.	345(98.3%)	6(1.7%)	0.000
	Illiterate	15(71.4%)	6(28.6%)	
	Read and write	48(94.1%)	3(5.9%)	
	Primary	302(95.6%)	14(4.4%)	
	Secondary	391(98.0%)	8(2.0%)	
	Higher education.	221(98.7%)	3(1.3%)	

*N.S. Not significant

Discussion

The present study shows that the prevalence of impaired visual acuity of at least one eye was 3.4%. Out of those (3.2%) of the children had moderate visual impairment of at least one eye and (0.2%) had severe visual impairment of at least one

eye. This figure is lower than that reported previously in Baghdad, Al Karkh (5.4%)⁽⁷⁾. Table 5 compares the visual impairment prevalence with other studies. We noticed an increase in the prevalence of impaired visual acuity with increasing age and this may be due to the increase in using smart displaying screens.

Table 5: A comparison of visual impairment prevalence in the present study with other studies.

Country	Time of study (year)	Sample size	Age group (year)	Prevalence of impaired visual acuity (%)
Baghdad, Iraq ⁽⁷⁾	2016	2104	6-11	5.4
Al Najaf, Iraq ⁽⁸⁾	2017	630	6- 15	15.4
Jordan ⁽⁹⁾	2005	160	6-18	17.5
Saudi Arabia ⁽¹⁰⁾	2019	410	6 -16	10.2
Iran ⁽¹¹⁾	2018	4106	7	0.34
Ethiopia ⁽¹²⁾	2020	1064	7-18	5.2
Sudan ⁽¹³⁾	2016	1775	6-15	6.4
Somalia ⁽¹⁴⁾	2017-2018	1204	6-15	13.6
Nigeria ⁽¹⁵⁾	2021	1167	5-15	3.6

Although previously published research cleared that girls tend to have a shorter axial length and shallower anterior chamber depth than boys, and hence a higher probability of being hyperopic⁽¹⁶⁾. The current study was unsuccessful in showing a significant statistical association between gender and impaired visual acuity which is in concordance with the published results of studies by Al Rasheed S et al in Sudan⁽¹³⁾, and Woldeamanuel GG et al in Ethiopia⁽¹²⁾. While our current finding disagrees with a study from Najaf, Iraq which showed females were more likely to have visual impairments than males⁽⁸⁾. Place of residency showed a significant association with impaired visual acuity, where higher percentages were reported in Al Zahraa (PHC) the reason for this is not clear, it could be due to the quality of work of vision examiners being better or due to poverty and ignorance of family about visual impairment or were less likely to have private health insurance. Level of education of both parents had a significant association with impaired vision, with higher percentages seen among children with illiterate fathers and mothers. Low education leads to low job opportunities and eventually, low income and poverty⁽¹⁷⁾. Agreeing with results by Woldeamanuel GG et al⁽¹²⁾ and Vila-Vidal N et al⁽¹⁸⁾ with the higher educational attainment of parents, awareness increases, and more care is provided to children.

In conclusion; the prevalence of impaired visual acuity among children was 3.4%, 32(3.2%) had a moderate impairment and only 2 (0.2%) had severe impairment.

impaired visual acuity was higher in families with low-educated fathers and mothers.

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References

- Burton MJ, Ramke J, Marques AP, Bourne RRA, Congdon N, Jones I, et al. The Lancet Global Health Commission on Global Eye Health: vision beyond 2020. *Lancet Glob Health* 2021;9(4):e489-e551.
- WHO. Blindness and vision impairment. Key facts. World Health Organization. [web page]; updated 2021. Available at <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment> (Accessed 23rd July 2022)
- Gogate PM, Chottopadhyay T, Kaur H, Narayandas S, Phadke S, Kharat M et al. Making blind children see: Impact of correcting moderate and severe visual impairment in schools for the blind. *Middle East Afr J Ophthalmol* 2020; 26(4): 216-22.
- Pattison B, Plymat K. Vision screening of school children: Should it be continued? *Contempt Nurse* 2001; 10: 163-71.
- Demmin DL, Silverstein SM. Visual impairment and mental health: Unmet needs and treatment options. *Clin Ophthalmol* 2020;14:4229-51.
- Annual report of community eye health in Iraq. Ministry of Health, Public health directorate, department of NCD. Iraq; Baghdad, 2021.
- Jamil N, Atta B. Screening for visual impairment among primary school students in Baghdad Al-Karkh. *Iraqi J Comm Med* 2017; (3):136-40.
- Abdulameer AJ, Alfadhul SA, Hameed HG, Kareem AA. Prevalence and possible attributes of decreased visual acuity among primary schoolchildren in Kufa City, Al-Najaf Governorate. *Med J Babylon* 2018;15:57-62.
- Al-Madani M, MdanatA, Al- Shubaki A, Hammouri Q. Causes of severe visual impairment and blindness among children in visually handicapped schools in Jordan. *JRMS* 2009; 16(1):10-15.
- Parrey M. Visual impairment in Saudi children. *Ann Clin Anal Med* 2019;10(6): 693-7.

11. Ghaderi S, Hashemi H, Jafarzadehpur E, Yekta A, Ostadimoghaddam H, Mirzajani A, Khabazkhoob M. The prevalence and causes of visual impairment in seven-year-old children. *Clin Exp Optom* 2018;101(3):380-5.
12. Woldeamanuel GG, Biru MD, Geta TG, Areru BA. Visual impairment and associated factors among primary school children in Gurage Zone, Southern Ethiopia. *Afr Health Sci* 2020;20(1):533-42.
13. Alrasheed SH, Naidoo KS, Clarke-Farr PC. Prevalence of visual impairment and refractive error in school-aged children in South Darfur State of Sudan. *African Vision and Eye Health* 2016;75(1):1-9.
14. Abdi Ahmed Z, Alrasheed SH, Alghamdi W. Prevalence of refractive error and visual impairment among school-age children of Hargesia, Somaliland, Somalia. *East Mediterr Health J* 2020;26(11):1362-70.
15. Ezegwui IR, Oguego NC, Okoye OI, Maduka-Okafor FC, Udeh N, Aghaji AE, Okoye O, Nwobi E, Umeh-Aneji C, Onwasigwe EN, Umeh RE. Prevalence of refractive errors and visual impairment in school children in Enugu South-East Nigeria. *Niger J Clin Pract* 2021;24(3):380-6.
16. Dandona R. Refractive errors in an urban population in southern India: The Andhra Pradesh Eye Disease Study. *Investigative Ophthalmology & Visual Science* 1999; 40:2810-8.
17. Jaggernath J, Overland L, Ramson P, Kovai V, Chan VF, Naidoo KS. Poverty and eye health. *Health* 2014;6:1849-60.
18. Vila-Vidal N, Guisasola L, Rius A, Alonso J, Tresserras R. Children's visual impairment and visual care related to socioeconomic status in Catalonia (Spain). *Child Care Health Dev* 2021;47(1):94-102.

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