



Prevalence of Lazy Eyes Among Primary School Students In Rural Areas of Baghdad City

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Article information

Article history:

Received: November, 7, 2022

Accepted: January, 31, 2023

Available online: April, 15, 2023

Keywords:

Lazy eye prevalence,
primary schools,
rural areas,

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Citation: Mukhaizer, M. H., Al-Khateeb, H. S., & Mohammed, I. A. (2023). Prevalence Of Lazy Eyes Among Primary School Students In Rural Areas Of Baghdad City. *Journal of Advanced Sciences and Nanotechnology*, 2(1), 204–214.

Abstract

To measure the prevalence of lazy eyes in Baghdad's rural primary school students. The sample consists of 311 students from 18 government-run primary schools; each student had their eyes examined in first- through sixth-grade primary classes, and children between the ages of 6 and 14 were included in the study to determine the presence of the lazy eye. Visual acuity (VA) was assessed using Snellen's chart, and a sample of students underwent the test. Lazy eye was then identified using the following criteria: 1) Either the two eyes' Snellen charts show a two-line difference or more, or the visual acuity is 6/12 or worse. 2) The continued presence of a visual acuity issue following refractive error correction. The results indicate that 311 students in total have lazy eyes, with a prevalence of 3.5% among students in this age group (9 to 12 years), which includes 40% males and 60% females. The refractive error in the lazy eye causes hyperopia in more than half of students (65%). Most students (95%) aren't aware that they have lazy eyes. On the count finger test for visual acuity, the results were 39% for the left eye and 38% for the right eye. A significant number of students (88%) did not wear glasses, and 93% reported having blurry vision. Poor academic performance was ranked at 75%, and anisometropia was at 36%. More than half of the students (57%) who were not seen by the medical staff arrived at school from the neighborhood primary care center. As a conclusion, in the rural Alker Kh district of Baghdad, 3.5% of students in government primary schools had lazy eyes.

1. Introduction

A common childhood-onset ocular disorder termed "lazy eye" is a condition where children's vision does not grow properly. Amblyopia is indeed the medical term for it. Because one or maybe both eyes are not able to establish a firm interaction with the brain. Often it only affects one eye, which means the children depend more on the intact eye and might see less well out of the impaired eye. The frequency of amblyopia varies widely around the world, with an estimated 1 in 50 children having lazy eyes. This frequency ranges from 0.2% to 6.2% worldwide. Most of the time, a lazy eye does not produce symptoms, and younger children usually do not realize that they have a visual problem, and if they are, they're usually unable to explain what's wrong. Lazy eye is a major childhood ocular disorder with bad effects on visual and ocular function development [1, 2].

The most often reversible cause of childhood vision impairment is a lazy eye [3]. Amblyopia, which is mostly brought on by uncorrected refractive error, strabismus, cataracts, and ptosis, can result in vision impairment if it is not treated early and properly [4]. Amblyopia is a unilateral or bilateral condition in which, although no visible structural or pathologic defects, the best-corrected visual acuity is below normal [5, 6].

However, if amblyopia is correctly and promptly treated, it may be curable. Recent amblyopia treatment studies have demonstrated that visual acuity can be successful after 8 years old, contrary to earlier findings that suggested that amblyopia treatment is useless after that age [7]. Amblyopia is typically used to describe a decline in best-corrected visual acuity (BCVA) in one or both eyes that cannot be solely attributable to an ocular structural problem. Organic amblyopia is defined as visual problems brought on by structural abnormalities of the eye and brain (such as congenital cataracts, optic nerve atrophy, retinal dystrophy, or anoxic brain injury) [8].

Premature delivery, small for gestational age, having a family history of amblyopia, congenital nasolacrimal duct occlusion, and maternal smoking during pregnancy are risk factors for the lazy eye [8].

1.1. *Etiology:*

The following categories apply to amblyopia's causes:

- Strabismus (50%)
- Anisotropic (17%)
- Combined anisometropia and strabismus (30%)
- Ametropia (3% or less)
- Sensory/visual impairment (3%)
- Organic causes such as retinal or optic nerve disorders (3%)

If untreated in childhood without optical and/or occlusion treatment, strabismus is linked to amblyopia. The disorder known as strabismus, which presents as improper eye alignment, is closely related to and is one of the main causes of amblyopia. Children who have the disease are more likely to have amblyopia [9]. Strabismus, sometimes known as "crossed eyes" or "gazing obliquely," is an alignment problem with the eyes. This prevalent childhood oculomotor disease causes deviation when binocular vision is absent [10, 11]. The US Preventive Services Task Force (USPSTF) advised that all children get a vision test at least once between the ages of 3 and 5 in February 2011.

At 10 and 15 months, as well as at two years old, a strabismus test utilizing the Hirschberg corneal reflex was included of the vision examination. The Hirschberg test is currently used to check for strabismus in kids between the ages of 1 and 6 every year. A general practitioner or a member of the health school staff will assess a child's visual acuity (VA) at ages 3, 4, 5, and 6. The recommendation is made for additional ophthalmological testing if subnormal VA or strabismus is discovered [12].

Due to the infantile state of visual processing, newborns have low visual acuity (VA). From birth to three months of age is widely regarded as the important phase for visual development. The "sensitive

period" for visual development lasts until 7 to 8 years of age, after which the brain plasticity for visual growth gradually declines [13].

To cure amblyopia, one must provide each eye with a strong retinal picture. Treatment options include treating any underlying organic conditions, prescribing the proper optical correction, and giving dominant eye occlusion/penalization therapy during the crucial time of visual development. The efficacy of amblyopia therapy declines with age, thus care for the condition should begin as soon as possible during the crucial period for visual growth [14]. When atropine is used as treatment, it causes cycloplegia in the non-amblyopic eye. Patching therapy includes covering the normal eye to stimulate the amblyopic eye [15].

With a better knowledge of the pathophysiology of amblyopia, new treatments for amblyopia are now being developed. Amblyz liquid crystal intermittent occlusion glasses (XPAND 3D Group, Ljubljana, Slovenia) are a technological advancement in occlusion therapy for amblyopia. Intermittent occlusion glasses are particularly effective since they are configured to independently switch between opaque and transparent phases at 30-second intervals. These glasses may potentially increase occlusion therapy compliance since they are more kid-friendly and do not induce the negative effects associated with sticky skin patches [16].

Any comparatively long-lasting and regular adjustment in how a sensory task is seen because of repeated practice is referred to as perceptual learning. Repetitive practice of specialized controlled visual activities can boost visual performance [17]. Patching may further impair binocularity in dichoptic training and, theoretically, may not be the best way to recover binocular cortex function in amblyopic persons [18]. Transcranial magnetic stimulation (TMS), a secure and non-invasive method of activating the human brain, is another emerging treatment for amblyopia. The method is based on the electromagnetic induction concept, whereby a short magnetic field is produced within a wire coil that has plastic coating and is put on the head. The magnetic field causes a tiny electrical current to flow across the cortex's underside while passing through the skull painlessly [19]. Amblyopia causes a reduction in dopamine levels in the retina. Increasing the levels of retinal dopamine may help amblyopia. First off, a single dose of levodopa, the direct metabolic precursor of dopamine, briefly increased contrast sensitivity and reduced scotoma size in the amblyopic eye, suggesting a potential therapy for adult amblyopia [20].

Modern Therapies: Different therapies for amblyopic individuals have been developed in response to interest and technology advancements. Because visual activities can only be accomplished when both eyes are working simultaneously, dichoptic therapy is used [21]. The patient uses red-green anaglyphic spectacles and plays the action-adventure game Dig Rush on an iPad® (Apple® Inc. Cupertino, CA, USA) with a touch-sensitive screen. The miners in the game are searching for gold. The patient's task is to dig for gold and bring it to a cart as rapidly as possible while dodging obstacles by using a finger to control both the miners and their environment [22]. One of the well-known games for binocular therapy is Falling Blocks [23].

Occlu-pad is a tool that selectively analyzes pictures for the amblyopic eye when using open binoculars. Polarized glasses and white-screen technologies are used by Occlu-pad. The iPad's liquid crystal panel's polarizing film layer is peeled off using white-screen technology, and by affixing the peeled film to glasses, viewing movies is only feasible while the subject is using polarized glasses. For instance, if the film is connected to the right-eye lens of the wearer's spectacles, only the right eye will be able to see the picture. The patient practiced eye-hand coordination by playing a random game with the Occlu-pad [24].

Monitoring of the amblyopia treatment response should include VA in the amblyopic eye and normal eye, refraction in both eyes, adherence to the recommended treatment, and treatment-related adverse events. six-week intervals following the start of amblyopia therapy for follow-up. Treatment should be reduced after maximal VA has been achieved [25].

1.2. Definition of terms

Refractive error: When accommodation is relaxed in an ametropic eye (a condition other than emmetropia, a normal eye condition), parallel light rays fail to converge into a sharp focus on the retina.

Myopia (Near-sight): Myopia is a refractive error in which the eye forms an image of an object at infinity in front of the retina when it is relaxed. Uncorrected myopia affects a person's ability to see close items clearly while blurring distant ones; this condition is known as being "sighted" at a "short" range [26].

Hypermetropia: Long-sight, often referred to as hyperopia, is a refractive error in which the eye (in its relaxed condition) projects an image of an object at infinity onto the retina. The retina will be the sharp focus of parallel light beams.

Visual acuity: This is the eye's resolving capability, or its capacity to distinguish between two distinct things [26].

Anisometropia: This occurs when the refractive error in one eye is larger than in the other [26].

Prevalence: Number of people affected by a condition in a population at a certain period divided by population size at that time [26].

1.3. The importance of the study:

The lazy eye can have a significant impact on a child's academic achievement and daily activities. It may also cause vision impairment, which may have economical and psychological consequences for the children. Many rural parts of Iraq, including Baghdad, have no reports of youngsters with sluggish eyes. As a result, there is an urgent need for studies to record the incidence of lazy eye in children in order to raise the attention of the government and non-governmental organizations to this health concern. As a result, it was agreed to carry out this project in that location. This subject will aid in reducing the impact of a lazy eye on children

1.4. Objective

Prevalence of lazy eyes among governmental primary school children in rural areas of Baghdad city / Alkerkh region

2. Materials and methods

Primary school students in Baghdad's rural areas/Alkerkh region were the subjects of a study on the prevalence of a lazy eye. The study was done in the Alkerkh region, west Baghdad city, at eighteen governmental primary schools. From November 2021 to April 2022, a basic random sample method was used to perform the study. The study's sample comprised all students in the chosen schools in rural parts of Baghdad City, ranging in age from 6 to >14 years old, and enrolled in primary classes from first to sixth grade. Each participating student gave their informed consent after being presented by the data collectors were four optometry student optometrists in the fourth year. The questionnaire was translated from English. The students were interviewed face-to-face using questionnaires to gather data, and an eye exam was performed on each student. Snellen's visual acuity chart (alphabet and tumbling E), measuring tape, trial lens frame, occlude, pinhole, pen torches, and educational posters include the equipment used during the eye exam. Visual acuity (VA) measurements were performed using Snellen's chart with and without a pinhole during the ocular examination. A 6-meter distance in the classroom was used to measure visual acuity. The anterior portion of the eye was examined using a pen light and a magnifying loupe. Each eye's VA was evaluated separately, and if it was less than 6/9, a pinhole was displayed and the test was repeated. A VA improvement with a pinhole was seen as a refractive defect, and a VA of less than 6/12 was considered to indicate impaired vision. Visual acuity of 6/6 or more was regarded as normal, while the refractive error was defined as unassisted distant visual acuity of 6/9 or less that improved with pinhole. People with positive test results are sent to an ophthalmologist for additional evaluation and care. In a primary school that was not the study sample, a two-day pilot study was done, before analysis, the data were reviewed for completeness and clarity.

2.1. *Data Analysis*

Data were analyzed using SPSS statistical method

2.2. *Ethical Considerations*

The dijlah university, administrators of the chosen schools, and school-screening students officially approved the given study. Parents of pupils who require additional assessment and monitoring received written communication from us.

2.3. *The inclusion criteria*

Students from the chosen government primary schools who had been identified as having amblyopia using any screening method met the inclusion criteria.

2.4. *The exclusion criteria*

Private schools and people with organic eye disorders were disqualified from the study.

3. Results

In total, 8850 students were included in this study, of which 311(3.5%) were discovered with amblyopia. A total of (311) pupils, comprising 124 (40 %) males, 187 (60%) females' participants (Figure 1)

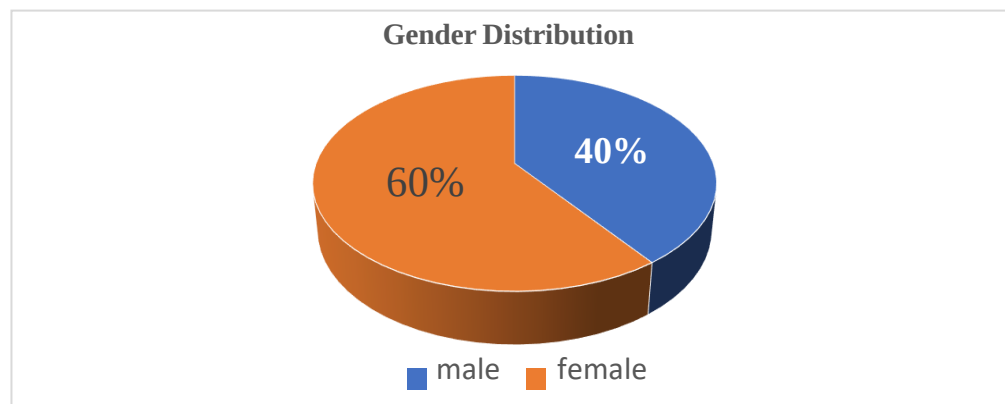


Figure (1) Gender Distribution: This figure demonstrated that the number or percentage of females outnumbered males.

This study showed that the age group 9 -11 years was the largest group of students and the > 14 years age group was the smallest group of students (sociodemographic data) (Figure 2)

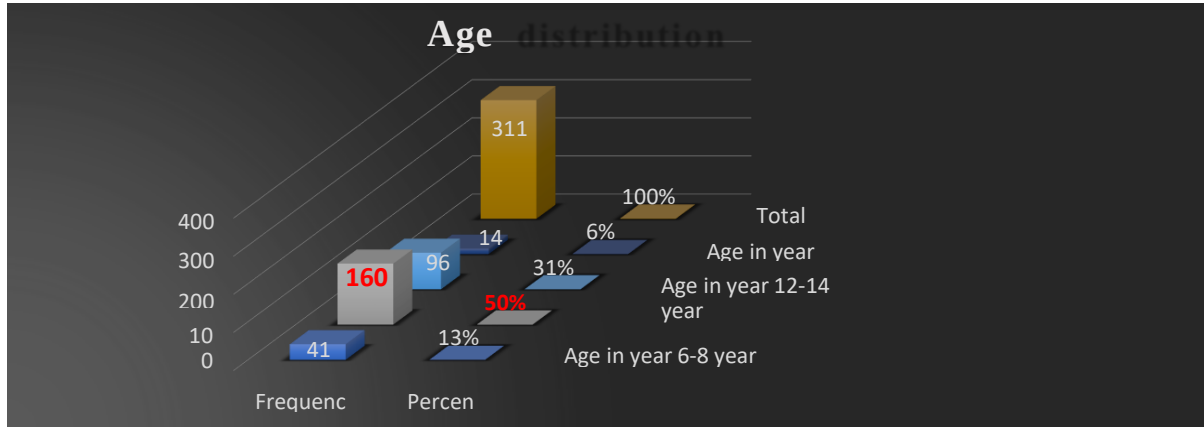


Figure (2): The distribution of refractive error types by age group.

Table (1) shows the results of refractive error in the lazy eye (5%) for myopia, hyperopia was (65%) and Table (2) Shows the result that vast majority of students (95%) are unaware that they have a lazy eye.

Table (1) The higher the percentage of hyperopia in the lazy eye, the greater the refractive error.

Refractive error in lazy eye	Frequency	Percent (%)
Myopia	17	5
Hyperopia	201	65
Both	93	30
Total	311	100

Table (2) Students response to the" child's knowledge that he has a lazy eye "section.

Does the child know that he has a lazy eye?	Frequency	Percent (%)
Yes	14	5
No	297	95
Total	311	100

Table (3), about the class of visual acuity, the count finger was the higher class (38.5%) among other classes.

Table (3) Status of (VA) of the students

Class -VA	Left eye, n	Left eye, n (%)	The right eye, n	The right eye, (%)
6/6	48	15.4	46	14.8
6/9	18	5.8	13	4.1
6/12	9	2.9	4	1.3
6/18	8	2.6	16	5.1
6/24	45	14.5	59	19.0
6/36	21	6.8	20	6.4
6/60	21	6.8	20	6.4
count finger	124	39.9	120	38.5
light perception	17	5.5	13	4.2
Total	311	100%	311	100%

Table (4) shows the results of assessing the wearing of current spectacles A high percentage (88%) of students did not wear current spectacles.

Table (4) Showed a negative attitude, and a large percentage of students did not wear current spectacles

Wearing current spectacles	Frequency	Percent (%)
yes	39	12
no	272	88
Total	311	100

Table (5) shows the results of assessing symptoms. A (93%) of students have blurred vision.

Table (5) Blurred vision was prevalent among symptoms associated with lazy eye, as expected.

Does the child have any symptoms?	Frequency	Percent (%)
None	6	2
Headache	246	79
Blurred vision	290	93
Eye pain	257	82
Difficulty concentrating	273	87

Light sensitivity	222	71
Itching	232	75
Color blindness	212	68

The (49%) had the highest proportion of pupils with Anisometropia as shown in Table 6.

Table (6) distributions of a student with eye diseases

Students with eye diseases	Frequency	Percent (%)
Anisometropia	152	49
High bilateral RE	112	36
Esotropia	33	11
Exotropia	14	4

There were (75%) of students who had poor academic performance as shown in Table 7.

Table (7) Students with lazy eyes, with a negative impact on academic performance

Academic performance	Frequency	Percent (%)
Poor	234	75
Good	70	22
Very good	5	2
Excellent	2	1

The results of assessing students' eye examen before. Half (53%) of students have not examined their eyes before as shown in Table 8.

Table (8) Half of the students had never checked their eyes before.

Eye students examined	Frequency	Percent (%)
Yes	146	47
No	165	53

The results of the eye students examined by the health team who visited the school from the nearest primary health care center, more than half (57%) of them did not examine by the health team as shown in Table 9.

Table (9) students' responses to the "eye examination by the health team visit" section.

Eye students examined	Frequency	Percent (%)
Yes	135	43
No	176	57

4. Discussion

The prevalence of amblyopia in our study was 3.5%; the cause of this high prevalence in the rural Baghdad city/Alkerkh region is unknown, however, it is possible that the primary factor contributing to this finding is that the parents believe waiting till their kid is older before starting therapy. Our study's findings about the prevalence of amblyopia in rural (1.2%) and urban (0.9%) areas are supported by General et al [27]. This outcome is consistent with Williams et al.[28] and Simons et al.[29] findings .s indicating the prevalence of amblyopia was (3.6%) in the British Isles and China, respectively.

The female sex was marginally more prevalent in the gender distribution of students enrolled in this study. Ayanniyi et al [30] discovered that there is a preference for the male gender due to pro-male cultural bias. According to the findings of this study, the age group 9- 11 years was the greatest and the age group > 14 years was the smallest. Aldebasi et al. [2], achieved the same outcome. However, 6% of the students were 14 or older, which is a pretty significant proportion. This group of students should ideally be in secondary school; ignorance and poverty are probable causes for delayed treatment of lazy eye; this value is lower than that reported by Ayanniyi et al., [30] who omitted students aged 16 and up from his study.

Our study found (65%) hyperopia as a refractive defect in the lazy eye, which corresponds with the findings of Mohammad A. Rashad et al, [31]. Most students (95%) are unaware that he has a lazy eye. Perhaps because of a lack of knowledge among parents. In terms of visual acuity, the count finger was the highest (38.5%) among other classes, indicating the need for an eye healthcare policy that will support and improve the school health program, particularly in rural areas of Baghdad city, for the early detection and management of visual impairment among primary school students.

The fact that many students (88%) were not wearing spectacles might be attributed to stigma and ignorance of the concept that the youngster could benefit from wearing spectacles. Using spectacles to improve eyesight is usually beneficial. Eye patching is occasionally used to strengthen the weaker eye. The children should feel well after wearing eyewear.

Because they have problems concentrating on reading, feel embarrassed, have regular headaches, or rub their eyes, a high number of students (93%) have a hazy vision, which can lead to poor self-esteem. In our study, the distribution of the four forms of amblyopia in rural regions was as follows: anisometropia (36%), the same finding as Dana Robey et al. In Australia, 2006, Yekta et al. and Faghihi et al. conducted research and found that the most common causes of amblyopia were anisometropia (66%), strabismus (27.5%), and ametropia (14.5%) [32]. Caca et al. [33] found that 46% of cases in Turkey were anisometropic, whereas 34% were strabismic.

Anisometropia was ranked second on the list of causes in two more investigations. In Japan, 60% of the cases were of unknown origin, 22% were anisometropic, 10% were ametropic, 7.5% were strabismic, and there were no cases of deprivation amblyopia, but in India, ametropia represented 50%, anisometropia 40%, strabismus 6.8%, deprivation 4.5%, and mixed causes 2.2% [27, 34].

Academic performance was (75%) poor; diminished vision may result in poor academic achievement, as well as impairing a student's ability to participate in class and participate in peer sports and social activities. Unfortunately, many kids (53%) do not obtain an adequate vision exam at an

important moment. Some of the rural health school workers who greet kids before they enter the schools for eye screening did not examine students thoroughly and appropriately.

Existing healthcare imbalances, a lack of healthcare infrastructure, competing for preventive healthcare goals, and eye examination skills all impede vision screening implementation in remote locations. Only (57%) of pupils had previously received an eye examination by health school employees visiting the school from the nearest primary health care center, lack of awareness of rural health services, and lack of eye health education for children, parents, and teachers, particularly in rural regions. It is crucial to note that all the impacted pupils were beyond the age of eight, which is the critical era for the development of amblyopia. This strongly supports the necessity for school-age children to be screened for amblyopia at an early age [35]. The eye is the system of vision, the center of facial expressions, and the ideal of cosmetic appearance in human beings also plays a significant role in communication [36].

5. Conclusions

Because visual impairment has a substantial influence on a child's life in terms of schooling and development, effective techniques for eliminating this readily treatable source of visual impairment must be established. One visual impairment in school-aged children was the lazy eye. Lazy eyes in children should be checked on a regular basis by school health programs with the right visual stimulus, amblyopia may be reversible. Amblyopia identification and therapy should begin as soon as feasible. Several studies have demonstrated that amblyopia therapy is effective in older children and adults. As a result, older children should be treated. There is a need for improvements in rural health eye care services.

Acknowledgment

We are grateful and respectful to the primary school administrators who assisted us in completing this study.

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