OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences
Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article **Paediatric Ophthalmology**

The Distribution of Iris Colour and Its Relationship to Myopia in Bangladeshi Patients

Dr. S.M.A. Mahbub[1*], Dr. Jamsed Faridi[2], Dr. Khair Ahmed Choudhury[3], Dr. Shovana Alam[3], Dr. Ashiqur Rahman Akanda[4], Dr. Mahamud Adnan[5]

[1]Long Term Fellow, Department of Paediatric Ophthalmology, National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh
[2]Resident Surgeon (Emergency & Casualty), Sheikh Fazilatunnessa Mujib Eye Hospital and Training Institute, Gopalgonj, Bangladesh
[3]Professor, Department of Paediatric Ophthalmology, National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh
[4]Associate Professor, Department of Paediatric Ophthalmology, National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh
[5]Assistant Registrar, Department of Ophthalmology, Shahid Ziaur Rahman Medical College, Bogura, Bangladesh

DOI: 10.36348/sjmps.2023.v09i02.008 | **Received:** 04.01.2023 | **Accepted:** 11.02.2023 | **Published:** 25.02.2023

***Corresponding author:** Dr. S.M.A. Mahbub
Long Term Fellow, Department of Paediatric Ophthalmology, National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh

Abstract

***Background*:** Myopia, or nearsightedness, affects a large percentage of the population and is typically identified in those under the age of 20. Having myopia makes it difficult to see far away. While you have no issue seeing nearby items, such as those used to indicate aisles in a grocery store, you may have trouble seeing further away ones, such as road signs. ***Objective*:** In this study our main goal is to evaluate the distribution of iris colour and its relationship to myopia in Bangladeshi patients. ***Method*:** This cross-sectional study was carried out at tertiary hospital from March 2020 to December 2021, researchers from several fields and sessions worked together on a single unified study. There were a total of 100 people, with a best corrected visual acuity (BCVA) of 6/6, and ages ranging from 11 to 25 years old. Patients were limited to no more than six hours of television every day. All three degrees of myopia (mild, moderate, and severe) were covered. ***Results*:** During the study, 51% belong to 10-15 years followed by 35% belong to 16-20 years and 14% belong to 21-25 years. In addition, among patients mild 55%, moderate 21%, and severe 24% myopia. Screen time, significantly associated with myopia. 40% who had screen time was 1-2 hours had severe level myopia. Followed by 45% who had screen time was 2-4 hours had severe level myopia and 50% who had screen time was 4-6 hours had severe level myopia. 66% who had mid-level myopia had grade I Irish color. Followed by 56% who had moderate level myopia had grade I Irish color and 50% severe level myopia had grade I Irish color. 66% who had simple myopia had grade I Irish color. Followed by 55% who had curvatural myopia had grade I Irish color. ***Conclusion*:** Darker iris color was linked to higher myopia-related refractive errors, even when other known myopia-related risk variables were taken into account.

Keywords: Refractive Errors, Myopia, Iris, Risk factor.

INTRODUCTION

Myopia is the most common form of nearsightedness in children and teenagers [1], and its prevalence is rapidly growing in all regions of the world [2, 3]. It is believed that both genetics and the environment have a role in the onset of myopia, or nearsightedness [4]. Several studies [5] have found that environmental factors are more significant than genetic ones in the onset of myopia.

Time spent outdoors has been shown to be important protective factors that can assist young individuals avoid developing myopia, and this has been the focus of current research on environmental risk factors for myopia [7]. The amount of light available may affect the correlation between outdoor time and myopia.

An animal study [8] found that chicks exposed to strong light had a slower rate of negative lens adaptation than those exposed to low light. On the other hand, there are researchers who disagree with the light intensity theory and argue that the spectrum makeup of lights rather than the intensity is the major cause of

myopia among persons who spend less time outside [9]. They suggested that the wavelength of light striking the eye is the most important factor in determining myopia.

One of the most prominent features of the human body, iris color is thought to be passed down mostly through one's genes [10].

Numerous genes [10, 11] have been linked to iris color. Not only that, but the iris's color controls how much light enters the eye. Iris color affects how much light reaches the retina; darker irides let in less light, while lighter irides let in more [15].

Therefore, there is a wide variety of eye color because melanin pigment varies in amount, packing, and quality. There is evidence from previous studies that suggest iris color can alter by the age of 6.

Infants have been observed to have non-pigmented irises, and iris pigmentation isn't always an instantaneous process. Changes in iris color and other physiological factors have been shown to affect the index over time. Factors that contribute to this include pregnancy, puberty, and trauma [17-19].

OBJECTIVE

To asses the distribution of iris colour and its relationship to myopia in Bangladeshi patients.

METHODOLOGY

From March 2020 to December 2021, researchers from several fields and sessions worked together on a single unified study.

Non-random purposive sampling was used to compile the data. There were a total of 100 people, with a best corrected visual acuity (BCVA) of 6/6, and ages ranging from 11 to 25 years old.

Patients were limited to no more than six hours of television every day. All three degrees of myopia (mild, moderate, and severe) were covered.

Between -0.25 to -3.00 D, mild myopia is considered the norm. Moderate myopia is between -3.25 and -5.00 D. Extreme myopia is defined as a refraction error higher than -6.00 diopters.

Two forms of myopia were identified in this research: straight-eye myopia and curved-eye myopia, the latter of which can be either with or against the rule.

Any other forms of refractive error were ruled out. Patients who had a father who was myopic were not included in this research.

Participants were not included if they had undergone any ocular surgery (including cataract and filtering operations), iris laser therapy, or used any medications to reduce intraocular pressure (IOP) in the past, as these procedures or drugs may have altered the iris's color or shape. Additionally, corneally cloudy eyes were not included since their condition may have affected the grading of the iris.

Ineligible patients included those with systemic comorbidities. Best corrected visual acuity (BCVA), slit lamp biomicroscopy, and objective and subjective refraction results were recorded and obtained for all patients throughout the ocular examination. BCVA was measured using a Snellen chart that projects distance and direction. Slit lamp biomicroscopy was utilized to thoroughly inspect the fundus to rule out eye disorders. Every patient had their eyes tested both objectively and subjectively. The RM-8000 autorefractor was used for the objective refraction. For the next step, we employed a Trial box and a trail frame to carry out some subjective refraction (Essilor instruments).

RESULTS

Table-1 shows age distributions of the patients where 51% belong to 10-15 years followed by 35% belong to 16-20 years and 14% belong to 21-25 years.

Table-1: Age distribution of the patients

Age distribution	Parentage (%)
10-15 years	51%
16-20 years	35%
21-25 years	14%

Figure-1 shows gender distribution of the patients, majority were female, 70%.

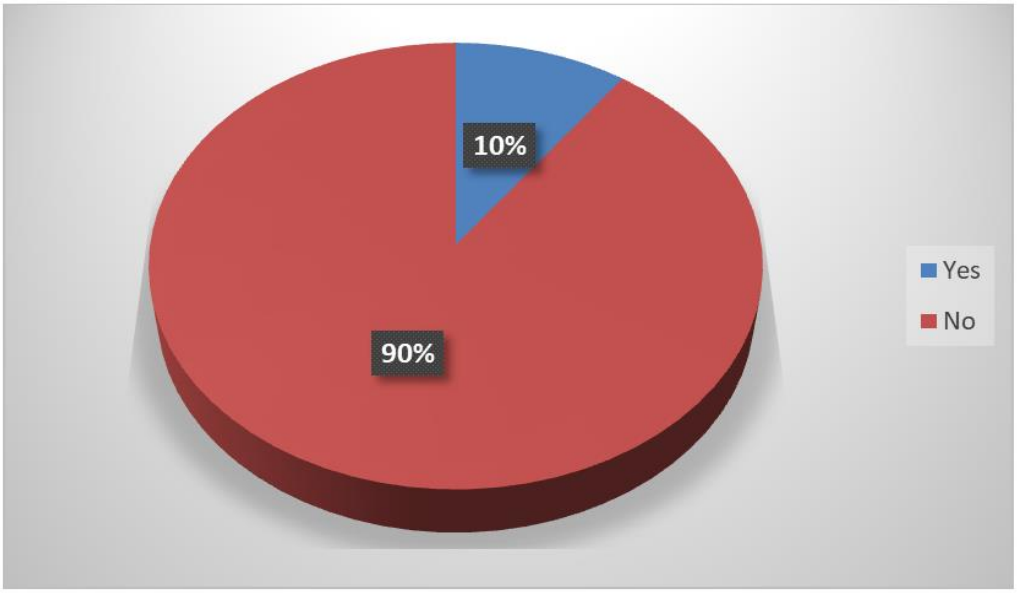

Figure-1: Gender Distribution

Figure-2 shows myopia prevalence where mild 55%, moderate 21%, and severe 24% myopia.

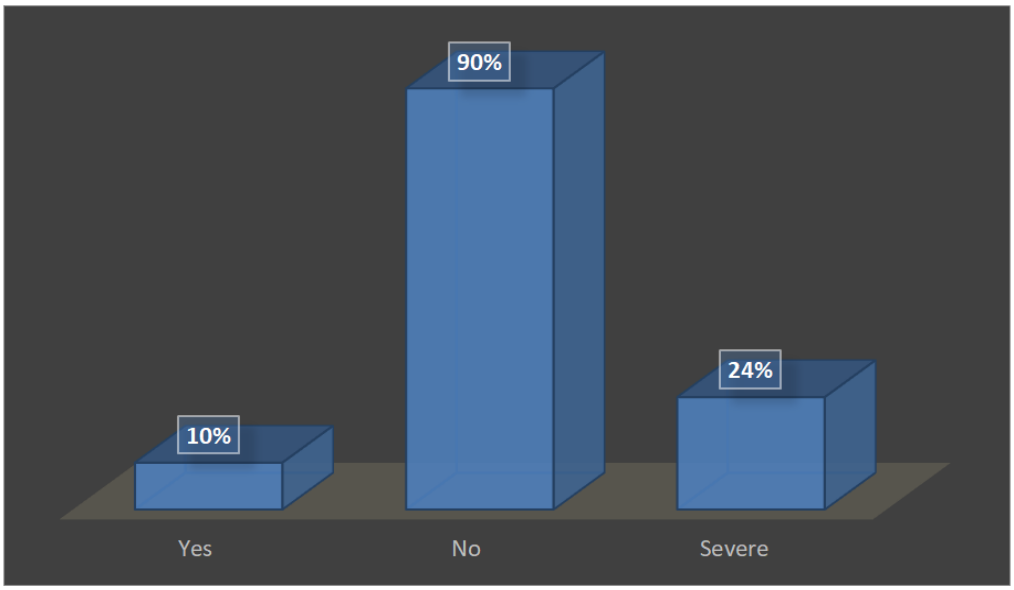

Figure-2: Myopia prevalence

Table-2 shows distribution of myopia cases according to demographic status where 40% who had good economic condition had moderate level myopia, followed by 45% who had average economic condition had moderate level myopia and 50% who had poor economic condition had moderate level myopia. Plus, 40% students and 45% adults had mild level myopia.

Table-2: Distribution of myopia cases according to demographic status

Socio economic	**Mild, %**	**Moderate, %**	**Severe, %**
Good	30%	40%	30%
Middle income	35%	40%	25%
Average	25%	45%	30%
Poor	25%	50%	25%
Occupation	**Mild, %**	**Moderate, %**	**Severe, %**
Student	40%	35%	25%
Job holder	45%	25%	25%

Table-3 shows distribution of myopia cases according to screen time where screen time, significantly associated with myopia. 40% who had screen time was 1-2 hours had severe level myopia. Followed by 45% who had screen time was 2-4 hours had severe level myopia and 50% who had screen time was 4-6 hours had severe level myopia.

Table-3: Distribution of myopia cases according to screen time

Socio economic	Mild, %	Moderate, %	Severe, %
1-2 hours	30%	30%	40%
2-4 years	30%	25%	45%
4-6 years	25%	25%	50%

Table-4 shows degree of myopia and iris grading where 66% who had mid-level myopia had grade I Irish color. Followed by 56% who had moderate level myopia had grade I Irish color and 50% severe level myopia had grade I Irish color.

Table-4: Degree of myopia and iris grading

Myopia	Iris grading				
	Grade I (lightest)	Grade II	Grade III	Grade IV	Grade V (Darker irish)
Mild	66%	56%	50%	50%	50%
Moderate	24%	34%	24%	25%	20%
Severe	20%	20%	26%	25%	30%

Table-5 shows types of myopia and iris grading where 66% who had simple myopia had grade I Irish color. Followed by 55% who had curvatural myopia had grade I Irish color.

Table-5: Types of myopia and iris grading

Myopia	Iris grading				
	Grade I	Grade II	Grade III	Grade IV	Grade V
Simple myopia	66%	55%	60%	30%	57%
Curvatural myopia	34%	45%	40%	70%	43%

DISCUSSION

The majority of people had dark brown or medium brown eyes, with only a handful having lighter eyes.

In a study conducted in Tehran in 2010, researchers comprising Hashemi *et al.,* [22] found that medium brown was the most frequent eye color.

Myopia is more common in those with darker eyes, according to research by Meng *et al.,* [17].

The link between ris color and myopia has been attributed to a wide variety of causes, but recent research suggests that particular genes and polymorphisms are at the root of the problem.

In particular, little research has been done on the ocular risk factors for astigmatism in adolescents and teens. New research shows that having astigmatism is linked to having a darker iris color.

It's probable that your iris color is linked to whether or not you suffer from astigmatism or myopia. To begin with, the frequency and severity of myopia are directly related to the degree of astigmatism.

There may be a link between astigmatism and myopia, as suggested by a few writers. Fan *et al.,* [23], doing a cohort study on a subgroup of children, revealed that astigmatism insertion at the initial evaluation predisposed the eyes to increased myopia after five years of follow-up.

However, myopia progressed more quickly among children with greater astigmatism. They concluded that astigmatism, and especially progressive astigmatism, could be a role in the onset of myopia in later life. Research on animals [17] has shown that myopia is more frequent in animals with black or grey eyes.

The strengths of this study include a substantial sample size and a high rate of participation.

Because an arbitrary selection was made instead of a random one. No inferences can be made regarding the importance of the associations we identified because our study was cross sectional. More studies are needed to definitively correlate iris color to myopia.

CONCLUSION

When controlling for other factors associated with myopia, a darker iris color was still associated

with more myopic refractive errors. Study participants were predominantly brown-eyed, with nearly 90% having either dark brown or medium brown eyes.

This study found that those with black eyes were more likely to acquire myopia than those with light brown eyes. The prevalence of myopia is higher in those with dark brown eyes compared to those with lighter brown eyes. Early diagnosis of ocular disorders is facilitated by knowing that those with dark brown eyes are more likely to have myopia than those with light brown eyes.

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