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Original Article

Association Of Different Refractive Errors With Literacy Level

Author's Affiliation

Lala Rukh

Ayesha Saleem

Correspondence Author:

Correspondence to:
Optometrist,
College of Ophthalmology
& Allied Vision Sciences (COAVS),
Lahore

BACKGROUND: Refractive errors are considered public health problem and most common human disorders with a considerable economic and health impact. An increasing trend in prevalence rate of refractive errors is due to environmental factors such as progressively more competitive education system, increased educational level and different occupation. People with higher educational level and low socioeconomic conditions are considered at high risk of myopia.

OBJECTIVE: To evaluate the association of different refractive errors with literacy level and to investigate which type of refractive error is more common as duration of education increases.

PATIENTS AND METHOD: Patients visiting Eye OPD Mayo Hospital Lahore, refraction room having refractive errors were examined.100 patients in age group 15 to 50 years were included in this study. Retinoscopy and subjective refraction was done in individuals having mild to moderate refractive error. Then they were asked about their literacy level and occupation. Educated patients were grouped in Literate group and uneducated were grouped in Illiterate group. Literate group was further documented as formal education and religious education. Formal education was subdivided in matriculation level, intermediate level, graduation level and post-graduation level.

RESULTS: In this study 44% refractive error was observed in students. At graduation level myopia was more common refractive error as compare to hyperopia and astigmatism. Moreover, myopia was associated with higher literacy level.

CONCLUSION: It is concluded that refractive errors are associated with literacy level and among all refractive errors myopia is found to be strongly associated with educational level.

INTRODUCTION:

Emmetropia (optically normal eye) is defined as state of refraction in which parallel rays of light coming from infinity are focused at sensitive layer of retina with accommodation being at rest. So there will be clear image of distant object in emmetropic eyes without any adjustment of its optics. Axial length is 24mm for an emmetropic eye. While Ametropia is state of refraction in which light rays coming from infinity fall in font of or behind the retina. Visual acuity is affected by ametropia. Refractive error is a condition that occurs when light fails to focus on the retina and form a blurred image. It is frequent cause of reduced visual function. If there is refractive error when viewing a distant object then eye is described as ametropic. Ametropia can be divided into:

- Myopia
- Hyperopia
- Astigmatism

Myopia is a condition that is caused by increased axial length and curvature of cornea become steep. Myopic can see objects clearly at short distances, but distant objects will not be clear.[1] In myopia or near sightedness vision for far objects appears blurry but there is clarity for near objects. The situation may be due to very steep corneal curvature or increase axial length[2]. Myopia results from a divergence from normality which may be change in the actual power of either the power of the lens or cornea and also due to deviation from the normal axial length of the eye. This result in diminished or blurred distance vision and this condition can be corrected by spectacles, contact lenses or with refractive surgery. A large myopia is risk factor for several number of sight-threatening eye diseases[3].

Prevalence of myopia in western countries is 25-50% in young adults, and 80% of young adults in population of South East Asia[4]. Myopia is a widespread ocular disorder; approximately 33% of adult population of United States is affected by this condition[5]. It is more prevalent among Asian populations, approximately 37% in Chinese children and 60% among young 11 to 17 years in rural China[6,7]. Myopia is directly related with other ocular pathologies and visual disorder[8]. Myopia characteristically shows a patronized course of its progression the first phase of it is emmetropic gradually become myopic that appear in the early school year life, after that fast phase of myopization occurs which stabilizes in the mid to teenage years[9]. There are more chances of increase progression before its levels off[10].

The estimation of myopia in United States and Western Europe countries is 1 in 4 people over age 40. Myopia affects more one in four people over age 40 in the United States and Western Europe whereas in forty age group hypermetropia affects about 10%[11]. While in urban people of East Asia, incidence of myopia in teenagers and adults is to more than 70%[12]. According to some views 2.5 billion persons will have myopia which is 1/3rd of the World's population in year 2020[13].

Hypermetropia or farsightedness arises from a condition of refractive element of the eyes in which light rays from an object do not have a point focus at retina but behind it. The risk factor may be too short axial length of the eyeball than normal or decrease corneal power due to its flat curvature. Hyperopic individual typically have trouble in seeing objects at close distances, but may also have difficulty in seeing objects at far distances as well[14]. The frequency of hypermetropia is estimated to be from 8.4% at age 6 years, 2-3% from nine to Fourteen years and approximately 1% at fifteen years. Hypermetropia decreases in its ratio with increasing age. The prevalence of hypermetropiais more among White children and people of rural areas. There is no finding about the connection between hypermetropia, gender and family status[15].

The consequences of hypermetropia may be diminished vision, asthenopia, accommodative anomalies, amblyopia, squint, Angle Closure Glaucoma, and retinal detachment. The distinctive features of high hypermetropia axial length of eye become short and anterior chamber become shallow[16]. Certain evidences have shown that heredity play a key role in development of hypermetropia than myopia and environmental factors have little influence[17]. There are two main contradictory views in the treatment of hypermetropia[18]. One view suggests that visual input have a role in the emmetropization[19].

According to this suggestion emmetropization may stop by wearing spectacle correction[20]. This suggestion provides the assumption that the process of emmetropization is heralded by wearing correction lenses that gives maximum acuity and accommodation for approximately clear normal vision[21]. Subsequent investigations have established differing outcomes of the consequences of refractive spectacle correction on emmetropization[22].

PATIENTS AND METHODS:

This descriptive cross-sectional study was conducted in College of ophthalmology and Allied vision sciences (COAVS) Lahore from October to December 2015. Patients visiting Eye OPD Mayo Hospital Lahore, refraction room having refractive errors were examined.100 patients in age group 15 to 50 years were included in this study. Retinoscopy and subjective refraction was done in individuals having mild to moderate refractive error. Vision was assessed by distance Snellen visual acuity chart Then they were asked about their literacy level and occupation. Educated patients were grouped in Literate group and uneducated were grouped in Illiterate group. Literate group was further documented as formal education and religious education. Formal education was subdivided in matriculation level, intermediate level, graduation level and post-graduation level. Sampling method

was non-probability convenient method. Refractive errors were dependent variable while type of refractive error, literacy level, socio-economic status and gender were independent variables. All the patients having refractive errors were included in this having age between 15 to 50 year. On the other hand emmetropic, patients with ocular disease, unresponsive, unwilling were excluded.

Before start of research, an informed consent was taken and all the procedure regarding research was explained to them to make sure their cooperation. All the data were entered and analyzed using Statistical Package for Social Science (SPSS Version 20.0). Quantitative variable like age is presented in the form of mean ± SD. Significance is assessed at the $p< 0.05$ levels for all parameters.

RESULTS:

The data was arranged in tabulation form as well as graphical and diagrammatic form for analysis of variables.

Table 1: Age Distribution

Age	Frequency	Percent
15-25	60	60
26-35	29	29
36-50	11	11
Total	100	100

Table 2: Gender Distribution

	Frequency	Percent
Male	47	47
Female	53	53
Total	100	100

Table 3: Type of Refractive Error

	Frequency	Percent
Myopia	**53**	**53**
Hyperopia	**32**	**32**
Astigmatism	**10**	**10**
Presbyopia	**5**	**5**
Total	**100**	**100**

Table:4 Literacy level

Literate	Frequency	Percentage
Matriculation level	15	15
Intermediate level	15	15
Graduation level	29	29
Post-Graduation level	11	11
Religious education	4	4
Illiterate	26	26
Total	100	100

Type of refractive error * Literate Crosstabulation

		Literate						Total
		Matriculation level	intermediate level	Graduation level	post-Graduation level	religious education	illiterate	
Type of ref. error	Myopia	10	11	20	7	2	3	53
	Hyperopia	5	2	4	3	2	16	32
	Astigmatism	0	2	4	1	0	3	10
	Presbyopia	0	0	1	0	0	4	5
Total		15	15	29	11	4	26	100

In this cross table chi-square test was applied on refractive error vs. literacy levels. This data shows the significant p value which is 0.003 (less than 0.05).

CONCLUSION:

The result revealed that as compared to other professions refractive errors were common in students and literate group, whereas in illiterates these were least common. And among all refractive errors myopia was strongly associated with educational level. Out of 100 patients 53% patients have myopia, 32% hyperopia, 10% astigmatism and 5% presbyopia. Moreover, at graduation level prevalence of myopia was more than other refractive errors.

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