

## Original Article

## VISUAL HYGIENE IN ADULT MYOPES

Rabia Mobeen, Ammara Faiz and Faisal Rashid

**Objective:** The purpose of this study was to evaluate. 1. The importance of visual hygiene in adult myopes. 2. To find out the association of myopia with posture and visual environment. Main outcome measures were to evaluate role of visual hygiene, to evaluate the effects of posture in developing myopia and to evaluate the effects of visual environment in developing myopia.

**Methods:** This was an institutional based cross sectional study conducted at College of Ophthalmology and Allied Vision Sciences in the main OPD of Eye Department, Mayo Hospital, Lahore, during the months of July to September 2016. Total of 100 subjects of both genders aged between 5-15 years, having Myopia of -1D to -5D were included in the study by using non-probability convenient sampling technique. All the subjects were asked to fill the questionnaire containing questions regarding academic performance with and without spectacles. Data was collected through a self designed questionnaire and analyzed on SPSS software (Version 20.00) and p value was calculated by one sample t-test and ANOVA.

**Results:** A total of 100 subjects were checked having myopia of varying degree (1.00-5.00diopters).The results showed that there was greater degree of myopia in subjects having poor visual hygiene. The results showed that out of 100 subjects, 98 were into the habit of cleaning their glasses before wearing them. Positive relationship between myopia development and reading distance was found. Those who watched TV on daily basis for 3 hours had myopia in the range of -4.25 to -5.0 D. It was also found that most of the subjects study under bright light. Higher degree of myopia was found in subjects who were also computer users. Positive association between posture and myopia development was also found.

**Conclusion:** The results concludes that poor posture, dim light while studying & excessive use of computer is significantly related to the degradation of naked vision. This data and whole study support the assumption that visual hygiene improvement could be useful in minimizing the myopia development.

**Keywords:** Visual Hygiene, Myopia, Adults, Posture, Near work.

### Introduction

Myopia occurs when distant object focused in front of retina due to eyeball elongation. As a result, the light entering the eye isn't focused correctly and distant objects look blurred it is mostly developed in early adulthood.<sup>1,2</sup>

Generally, nearsightedness first occurs in school-age children. Because the eye continues to grow during childhood, it typically progresses until about age 20. However, nearsightedness may also develop in adults due to visual stress or health conditions.<sup>3</sup>

Myopia can be classified based on cause or degree of severity or age of onset. The exact cause of myopia is still undetermined but two contributing factors are myopic parents and excessive near work. The excessive amount of reading and other close work that we do in our modern society is the REAL cause of acquired myopia.

Lighting while studying play important role in

developing myopia, low lighting cause dilation of pupil allowing more light to pass and entire lens receive excessive amount of light rays. Also, lesser accommodation is needed during near work in the presence of brighter illumination. Educated people of modern society use their vision more for near work while studying, office workbooks reading and using computer as compared to illiterate people. Near work Induce Transient Myopia (NITM) is a type of short-term myopia when the far point shifts immediately following a sustained near visual task.<sup>4</sup>

Essentially, the individual's far point of eyes varies with illumination level. Night myopia is mainly caused by dilation of pupils allowing more light to pass resulting in aberration and it finely leads to more myopia. Night myopia has greater effects on younger myopes than elderly. Form deprivation myopia is the type of myopia which occurs when there is limited vision range & illumination or with the use of artificial

contact lenses. This type of myopia is considered reversible within short duration of time.

A study in 2008 reveals the relation between myopia and intelligence level. Near work is considered as common cause for myopia so myopic child is more adapted for readings and studies which enhanced intelligence.<sup>5</sup> Authors Parssinen and Lyyra also reveal more myopic progression in subjects using more accommodation than subjects needing less accommodation.<sup>6</sup>

Adults use computers almost exclusively. Today, millions of children are using computers every day, at school and at home, for education and recreation. Computer viewing is complicating how children use their eyes in school because these visual skills are not yet fully developed in children, making any near-point activities that much more difficult.

This study examined the posture of young subjects while studying and its relation to the degradation of naked vision. The posture while studying was quantitatively analyzed, along with a comparison made with visual functions. The parameters were:

1. Viewing distance (cm)
2. Neck angle
3. Vertical gaze direction
4. Viewing angle.

A significant relationship arose between the viewing distance and eye accommodation (diopter), near point (cm), viewing angle and neck angle. Based on the results, author concluded that poor posture, particularly decreased neck angle, is significantly related to the degradation of naked vision.<sup>8</sup>

A study was conducted on a large population reading, writing, working on a computer or watching television might be associated with the occurrence of myopia. The obtained results indicate that reading, writing, working on a computer might be associated with the occurrence of myopia among schoolchildren.<sup>9</sup> The prevalence of myopia is higher in the city than in the countryside. One possible explanation for these different rates could be that schoolchildren in the city spends more time reading and writing outside of school compared with children in the countryside. Myopic children in both the city and the countryside spent more time reading and writing compared with non-myopic children. This increased near-work activity may contribute to the prevalence of myopia.<sup>10</sup>

Nearsightedness is a very common vision condition affecting nearly 30 percent of the U.S. population. Some research supports the theory that nearsightedness is hereditary. There is also growing evidence that it is influenced by the visual stress of

too much close work.<sup>11</sup>

In Australia, subjects who performed high levels of near work but low levels of outdoor activity had the least hyperopic mean refraction. Furthermore, in an analysis combining the amount of outdoor activity and near work activity spent, children with low outdoor time and high near work were two to three times more likely to be myopic compared to those performing low near work and high outdoor activities.<sup>12</sup>

Children who read continuously for more than 30 min were more likely to develop myopia compared to those who read for <30 min continuously. Meanwhile, children who performed near-work at a distance of <30 cm were 2.5 times more likely to have myopia than those who worked at a longer distance. Similarly, children who spent a longer time reading for pleasure and those who read at a distance closer than 30 cm were more likely have higher myopic refractions.<sup>13</sup>

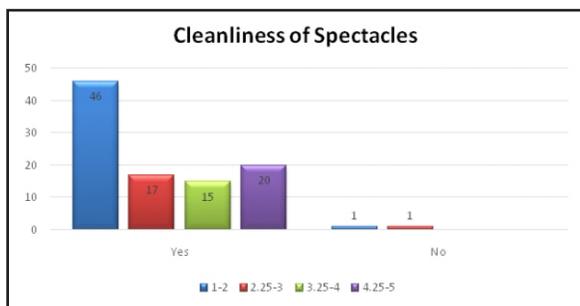
The purpose of this study was to evaluate the importance of visual hygiene in people aged between 10-15 years. Usually subjects might not be aware of their problem related to poor visual hygiene. This study will help to prevent development of myopia related to bad posture, dim illumination and unawareness of visual hygiene. So, purpose was to find difference in degree of myopia in subjects using good hygienic environment and those who does not care about the importance of visual hygiene.

## Methods

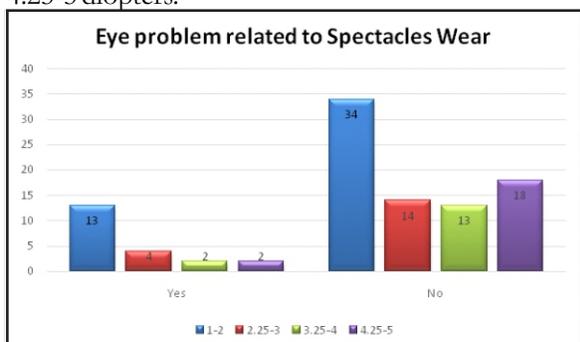
This was an institutional based cross section study conducted at College of Ophthalmology and Allied Vision Sciences in the main OPD of Eye Department, Mayo Hospital, Lahore, during the months of July to September 2016. It included selection of research type, target population, sample size, study design of survey, proforma, questionnaire, dummy tables, sampling method, research methodology, organizational issues, pilot study and work plan. Total of 100 subjects of both genders aged between 10-15 years, having Myopia of -1D to -5D were included in the study by using non-probability convenient sampling technique. All the subjects were asked to fill the questionnaire containing questions regarding academic performance with and without spectacles. Data was collected through a self designed questionnaire and analyzed on SPSS software.

## Results

Figure 1 Relationship between cleanliness of spectacles and myopia.



**Fig-1:** shows that out of 100 subjects, 98(98%) subjects were cleaning spectacles while 2(2%) were not cleaning their spectacles. This also shows that there were 46(46.93%) subjects having myopia 1-2 diopters, 17(17.35%) subjects having 2.25-3 diopters, 15(15.31%) subjects shows myopia of 3.25-4 and 20(20.49%) subjects were in the range of 4.25-5 diopters.



**Fig-2:** Relationship between eye problems and spectacle wear.

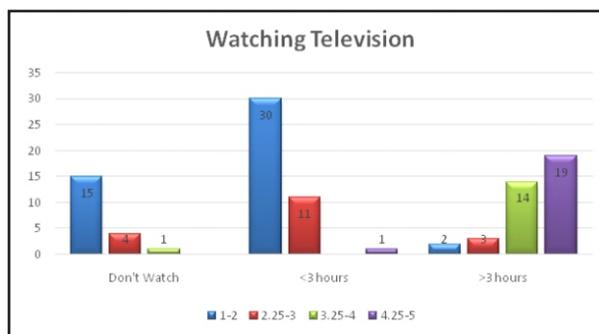
**Figure-2** shows that out of total 100 subjects, 21(21%) were having problem (Headache, eyeache, blurring, discomfort) in wearing of spectacles while 79(79%) were not having problem in wearing spectacles. This also shows that there is no significant relationship between the degree of myopia and spectacles wearing problem. ( $p > 0.05$ )



**Fig-3:** Relationship between reading distance and myopia.

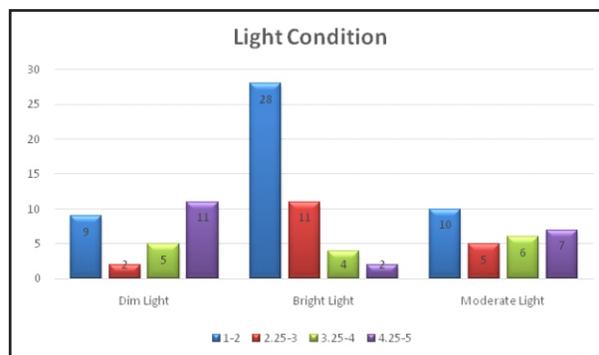
**Fig-3** shows that there is positive relationship

between myopia development and working distance. This shows that there is greater degree of myopia (4.25-5 diopters) in subjects using studying distance < arm length or arm length as compared to those who studied at distance greater than arm length. ( $p < 0.05$ )



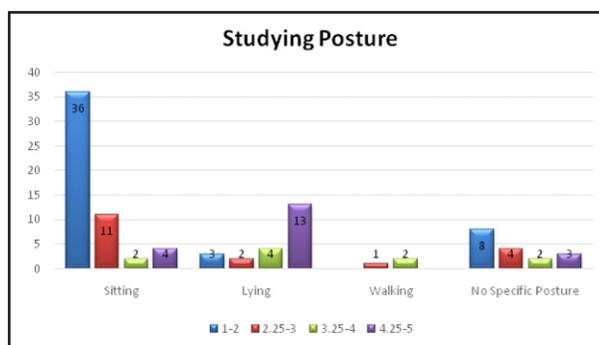
**Fig-4:** Relationship between watching television and myopia.

**Fig-4** shows that out of total 38 subjects having myopia of 4.25-5 diopters, 19 were watching TV more than 3 hours. Greater degree of myopia was present in subjects watching TV more than 3 hours. ( $p < 0.05$ )



**Fig-5:** Relationship between light condition and myopia.

**Fig-5** shows that the subjects using bright light while studying have low degree of myopia as compared to those subjects using moderate and dim light. ( $p < 0.05$ )



**Fig-6:** Relationship between study posture and myopia.

**Fig-6** shows that out of 19 subjects there were 13

subjects having myopia of 4.25-5diopters using lying posture while studying as compared to those studying with sitting posture, walking and non-specific posture. So the results showed positive association between posture and myopia development. ( $p<0.05$ )

## Discussion

In this study, different variables were included like spectacle cleaning, spectacles wearing eye related problems (headache, eyeache, blurring, Asthenopic symptoms), duration of computer and television exposure, illumination level while performing near work, posture adaptation during studying and regular follow ups to ophthalmologist/optometrist after starting spectacles wearing to evaluate the role of visual hygiene in developing myopia.

A total of 100 subjects were checked having myopia of varying degree (1.00-5.00diopters).The results showed that there was greater degree of myopia in subjects having poor visual hygiene. The results showed that out of total 100 subjects, 98(98%) were into the habit of cleaning their glasses before wearing them, positive relationship between myopia development and reading distance was found. Those who watched TV on daily basis for 3 hours had myopia in the range of -4.25 to -5.0 D. It was also found that most of the subjects study under bright light. Higher degree of myopia was found in subjects who were also computer users. Positive

association between posture and myopia development was also found.

It is recommended that sitting posture should be erect and comfortable. Avoid reading while lying on your stomach on the floor. Do not sit any closer to TV than 6 to 8 feet, and be sure to sit upright. Maintain good posture. A sloping surface of 20-23 degree tilted from horizontal that makes an optimum angle should be used. Provide for adequate general illumination, as well as good central illumination, at the near task. Long study hours or prolonged use of computer screens can have adverse effect on our eyes so care must be taken in this context. Avoid continuous work for too long time without giving rest to eyes. There should be regular follow ups to know about refractive status and progression of disease.

## Conclusion

The study concluded that the significant association of myopia development with posture adaptation in doing near work is because there was greater degree of myopia in subjects having bad posture like lying as compared to those having sitting posture. Similarly the subjects studying in dim light and used computer more than 3 hours were seemed to have high degree of myopia as compared to those subjects using bright/moderate light.

*College of Ophthalmology & Allied Vision Sciences,  
K E M/Mayo Hospital, Lahore.*

[www.esculapio.pk](http://www.esculapio.pk)

## References

- 1.Meidani A, Tzavara C. Comparison of efficacy, safety, and predictability of laser in situ keratomileusis using two laser suites. *Clin Ophthalmol*. 2016 Aug 24;10:1639-46.
- 2.Morjaria P1, Murali K2, Evans J3, Gilbert C4. Spectacle wearing in children randomised to ready-made or custom spectacles, and potential cost savings to programmes: study protocol for a randomised controlled trial. *Trials*. 2016 Jan 19;17:36.
- 3.Shah SP1, Jadoon MZ, Dineen B, Bourne RR, Johnson GJ, Gilbert CE, Khan MD. Refractive errors in the adult pakistani population: the national blindness and visual impairment survey. *Ophthalmic Epidemiol*. 2008 May-Jun;15 (3):183-90.
- 4.Ong, E; KJ Ciuffreda (1995). "Near work-induced transient myopia: a critical review". *Doc Ophthalmol*. 91 (1): 5785.
- 5.Ciuffreda KJ, Vasudevan B. Near work-induced transient myopia (NITM) and permanent myopias: is there a link? *Ophthalmic Physiol Opt*. (2008); 28 (2):10314.
6. Parssinen O, Lyyra AL. Myopia and myopic progression among schoolchildren: a three-year follow-up study. *Invest Ophthalmol Vis Sci* 1993; 34: 2794-2802.
7. Jeffrey R, Anshel. Kids and computers: Eyes and Visual systems. *The RSI Network*. 2000;42: 1-800-383-1202.
8. Marumoto T, Sotoyama M, Jonai H, Yamada H, Kanai A and Saito S, et al. Significant correlation between school myopia and postural parameters of subjects while studying. *International Journal of Industrial Ergonomics*.1998; 23: 33-39.
9. Czepita D, Mojsa A, Ustianowska M, Czepita M, Lachowicz E. Reading, writing, working on a computer or watching television, and myopia. 2010; *Klin Oczna* 112(10-12): 293-5.
- 10.Saw SM, Zhang MZ, Hong RZ, FU ZF, Pang MH, Tan DT. Near-work activity, night-lights, and myopia in the Singapore-China study. *Arch Ophthalmol*. 2002 May; 120(5): 620-7.
- 11.Myopia (Nearsightedness). American Optometric Association. Available at <http://www.aoa.org/myopia.xml>.
- 12.Rose KA, Morgan IG, Ip J et al. Outdoor activity reduces the prevalence of myopia in children. *Ophthalmology* 2008; 115:1279-85
- 13.Saw SM, Carkeet A, Chia KS, Stone RA & Tan DT. Component dependent risk factors for ocular parameters in Singapore Chinese children. *Ophthalmology* 2002; 109: 2065-71.