

# Myopia and Near Work Activity in Maderassa Children in Karachi

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**Purpose:** To determine the relationship of myopia and near work in Maderassa children in Karachi.

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**Material and Methods:** A cross-sectional study of 300 maderassa children aged 9 to 17 years was conducted in 3 Maderassa in Karachi. Cycloplegic Refraction, keratometry, and biometry measurements were performed. In addition the number of year's child was studying in this maderassa, and near work activity (reading in hours per day) was also asked.

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**Results:** Of the 300 children in the sample, 118 (39.3%) were myopes, 33 (11%) hypermetropes, and 149 (49.6%) emmetropes. Myopia was the most common type of refractive error. The average refractive error of these myopic eyes was -2 D. Mild myopia ( -0.50 to -2.99 D) was found in 59.3 % of children, moderate myopia ( -3.00 to -5.99 D) in 30.5 % and severe myopia ( more than -6.00 D) in 10.1 %. Association of near work activities and myopia emerged, as we divided the students in to 2 groups, Group A children who were in the Maderassa for more than 3 years, consists of 120 children and group B children who were in the Maderassa for less than 3 years consist of 180 children.

It was found that 50.83% of children in Group A had myopia and the average refractive error of these myopic eyes was -3 D. 31.66 % of children in Group B had myopia and the average refractive error of these myopic eyes was -1 D.

**Conclusions:** The study results suggest that myopia is a rather common refractive error in Maderassa students. Findings also indicate that myopia is probably correlated with educational level and excessive near work.

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**M**yopia is defined as nearsightedness caused by an incongruity between the power of the optical elements of the eye and its axial length. The object image is projected in front of the retina, and corrective lenses are necessary to displace the image backward, thus producing a clear retinal image. Although the causes of myopia are unclear, evidence supports both genetic and environmental components, among which are higher amounts of near work<sup>1,2</sup> years of education<sup>3</sup> and intelligence<sup>4</sup>. There has been a dramatic increase in myopia prevalence rates over the past few decades in Asia<sup>5-7</sup>. The world-wide urban rural patterns derived from both incidence and prevalence data are consistent with the near work hypothesis that increased reading and computer use may be a risk factor for myopia<sup>8</sup>. The increase in rates has been remarkable in young Asian children, suggesting that the rapid increase in myopia prevalence rates has been attributed to increases in reading activity and other environmental factors<sup>7</sup>. Researchers in Asia point to their rigorous schooling system and the long hours children spend studying as being responsible for the high rates of myopia in Asia, rates that may be on the increase<sup>9,10</sup>. As myopia has onset and progression in childhood, it is important to focus research on these age groups.

Therefore, we examined the correlation of potential risk factor such as reading in 300 young maderassa children, aged 9 to 17 years. The present article reports the detailed evaluation of the reading with myopia and ocular biometry measures in these young subjects.

## MATERIAL AND METHODS

We report cross-sectional study that consists of the entry data on maderassa children aged 9 to 17 years. The study was supported by 3 maderassas located in Clifton area of Karachi. 300 students studying in these maderassas participated in this study. As it was difficult for female Maderassa children to come to the hospital for eye examination, so we selected male Maderassa student only. The children eyes were examined during the first 2 weeks of February 2007. Corrected and uncorrected distance visual acuity was measured using Snellen's chart. After instillation of

0.5% proparacaine, cycloplegia was induced in each eye with 3 drops 1% Cyclopentolate instilled 5 minutes apart. At least 30 minutes after the last cycloplegic drop, autorefractometer (RM 8000B Topcon) was used to obtain five consecutive refraction measurements.

Corneal curvature reading was obtained by keratometer (OM4 Topcon). Ultrasound biometry measurements of axial eye length was performed using biometry machine (Sonomed 100Amodel), after 1 drop of 0.5% proparacaine.

The study hours, time spent reading for all children studying in these 3 maderassas were similar, 10 hours per day. They start to hifz Quran after Fajr prayer till Maghrib prayer and they have break for 2 hours in between 1 to 3 pm. As there was no age limit for joining the Maderassa we divided the children in 2 groups, Group A children who were in the Maderassa for more than 3 years and group B children who were in the Maderassa for less than 3 years.

The measurements of refraction were analyzed as spherical equivalent. Myopia was defined as a negative refractive error of at least -0.5 D. Results in right and left eyes, analyzed separately, were found to be similar, thus only results of the right eye are presented. Subjects were divided into three refractive error groups based on their SE refractions; Non myopes (SE < -0.5D), mild myopes (SE -0.5 to -2.99 D), moderate myopes (-3.00 to -5.99 D) and severe myopes (SE -6.0 D or more).

## RESULTS

### Prevalence of Myopia

Initially 320 Maderassa children were invited, 20 of them was excluded because of eye diseases other than refractive errors. Among them 8 had strabismus, 8 had amblyopia, and 4 had corneal opacity.

Of the 300 children in the sample, 118 (39.3%) were myopes, 33 (11%) hypermetropes, and 149 (49.6%) emmetropes (Table-1). Myopia was found to be the most common refractive error. It was present in 39.4 % of the children. The average refractive error of these myopic eyes was -2 D. Mild myopia (-0.50 to -2.99) was found in 59.3 % of children, moderate

myopia (-3.00 to -5.99 D) in 30.5 %, and severe myopia (more than -6.00 D) in 10.1 % (Table-2).

### Ocular Components

Eyes in children with higher myopia were more likely to have higher cylinder power, longer axial length, and steeper corneas than were eyes in children with lower myopia or no myopia.

### Risk Factors

Consistent with the development of myopia, the prevalence increased with advancing age (11% at age 9yrs, 29% at age 13 yrs and 39.3 % at age 17 yrs) (Table-3).

Association of near work activities and myopia emerged, as we divided the students in to 2 groups:

Group A children who were in the Maderassa for more than 3 years, consists of 120 children and group B children who were in the Maderassa for less than 3 years consist of 180 children. It was found that children in Group A had 50.83% of myopia (61 children out of 120 had myopia) and the average refractive error of these myopic eyes was -3 D. Children in Group B had 31.66 % of myopia (57 children out of 180 children had myopia) and the average refractive error of these myopic eyes was -1 D (Table-4).

**Table 1:** Prevalence of myopia

	No of Patients (300) n (%)
Myopia	118 (39.3)
Hypermetropia	33 (11.0)
Emmetropia	149 (49.60)

**Table 2:** Average myopic refractive error

	No of Patients (118) n (%)
Mild myopia (-0.50 to -2.99)	70 (59.3)
Moderate myopia (-3.00 to -5.99 D)	36 (30.5)
Severe myopia (more than -6.00)	12 (10.1)

**Table 3:** Prevalence of myopia with advancing age

	No of Patients (300) n (%)
Age 9 years	33 (11)
Age 13 years	87 (29)
Age 17 years	118 (39.3)

**Table 4:** Prevalence of myopia in group A and group B

	No of Patients n (%)	Average refractive error
Group A (Total 120)	61 (50.83)	- 3 Diopters
Group B (Total 180)	57 (31.66)	- 1 Diopters

## DISCUSSION

In this study, near work was significantly associated with myopia. Children, who spend more time reading in hours per day, were more likely to have higher myopia. The prevalence of myopia in maderassa children in our study was 39.3% and it was higher in group A children which was 50.8%, it comprises children who were studying in maderassa for more than 3 years.

In multicentre, population based studies of refractive error in children aged 5 to 15 years in china, Chile and Nepal, the prevalence rates of myopia were 16.2%, 5.8% and 0.3% respectively<sup>11-13</sup>.

In a Singapore-china study, the prevalence rate of myopia in Singapore children was 36.7% compared to Xiamen (China) which was 18.5%. Singapore has highly competitive educational system, whereas Xiamen school system is not so demanding, more near work activity may explain the difference in the prevalence rates<sup>14</sup>.

An epidemiological study, concerning the prevalence of myopia among the student population (15-18 years old) of Northern Greece, myopia prevalence was 36.8%. It was found that myopia correlates strongly with near work and school performance<sup>15</sup>.

Boys in orthodox Jewish schools were found to have higher rates of myopia (81.3%) compared with boys in general Jewish schools (27.4%). Orthodox schooling is characterized by sustained near vision

and frequent change in accommodation due to the swaying habit during study<sup>16</sup>.

In Xiamen, China the prevalence of myopia in urban school children was 19.3% and in rural school children was 6.6%. The average hours per day children spent in reading and writing outside of school was 2.2 hours in the city compared with 1.6 hours in the countryside. These data suggest the prevalence of myopia is higher in the city than in the countryside. One possible explanation for these different rates could be that school children in the city spend 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>17</sup>.

No study had been found in Pakistan to assess the risk factors associated with myopia. Till date only studies that are done are mostly screening programmes.

A screening programme for vision in school was performed in the city of Lahore, 1996-97. Total of 1310 children examined in high and socioeconomic classes. The prevalence of refractive error is about 22.21% in the total screening population of School children from age 4-15 years<sup>18</sup>.

To investigate the prevalence of refractive errors in school children, 10-16 years old children studying at schools of districts Rawalpindi and Islamabad were initially screened Myopia was found to be three times more common (3.26%) than hypermetropia (0.99%)<sup>19</sup>.

All these studies suggests that large amount of near work in childhood may contribute to the prevalence of myopia as was found in our study. The world-wide urban rural patterns derived from both incidence and prevalence data are consistent with the near work hypothesis that increased reading and computer use may be a risk factor for myopia.

## CONCLUSION

The study results suggest that myopia is a rather common refractive error in Maderassa students. Findings also indicate that myopia is probably correlated with educational level and excessive near work.

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