Original Article

# To assess the impact of the educational interventions for uncorrected refractive error among school children in Meerut.

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**Abstract:**

**Background:** Eyes are the best God gift to our body as vision is important in development as it allows interaction with the environment. Appropriate correction prevents the development of childhood amblyopia and enables better performance at school. Later in life carrier of the youth is very much dependent on the visual acuity. Therefore study aims to find the prevalence of the uncorrected refractive error among school children in the age group of 13-16 years and factors contributing to the refractive error.

**Methods:** It is institutional based crossed sectional study in English medium private school children in the age group 13-16 years. For one week they were screened for visual acuity from a Standard Snellen Chart. On pre-informed date educational intervention was conducted; they were followed up after one week of intervention for final assessment.

**Results:** Prevalence of the uncorrected refractive error was 14.8% Distance for watching TV less than 3 m and computer less than 1 m were highly significant. Prolonged duration of TV watching for more than 4 hours in a day and indulgence in computers for more than one year were also significant. In follow up after education intervention, all the children with uncorrected refractive error except 2 had paid visit to ophthalmologist.

**Conclusion:** Community based screening through school is most appropriate strategy to detect early any visual impairment, but school based approach must include teachers orientation also for prevention of eye disease.

**Key words:** Uncorrected refractive error, adolescents, educational intervention

## Background:

Eyes are the best God gift to our body as vision is important in development as it allows interaction with the environment. Refractive errors constitute a sizeable proportion of any large eye OPD in our country. The overall incidence has been reported to vary between 21% and 25% of the patients attending eye OPD in India[1]. About 13% of Indian population is in the age group of 10-15 years[2]. Deprivation may lead to long-term visual impairment[3,4]. Appropriate correction prevents the development of childhood amblyopia and enables better performance at school. Later in life carrier of the youth is very much dependent on the visual acuity. Refractive errors are usually present in the childhood and continue in the adult life[5-8]. The presence of uncorrected refractive errors and an associated deficit in vision may be difficult to identify in young children. Efficient pre-school and regular school health services are available in developed countries and the job of detecting (and managing) refractive errors lies mainly on the school health personnel as well as the optometrist. Even in the presence of such efficient school health services these developed countries are now taking help from community health workers and teachers for the early detection of visual disorders in school children[9-11]. Unfortunately, they are not given much importance in our society which is evident from the fact that there is no effective system of pre-school visual examination of children either in the government sector or in the private sector. Therefore study aims to find the prevalence of the uncorrected refractive error among school children in the age group of 13-16 years and factors contributing to the refractive error.

## Objectives:

(1) To find out prevalence of the uncorrected refractive error among the students .

(2) To study the risk factors exposure for the refractive error among students

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(3) To assess the impact of the educational intervention among the affected students for use of spectacles and practicing eye care.

## Material and Methods:

Study design is institutional based cross sectional study. It is conducted in the setting of one purposively selected English medium private school. Study population constitute school children in the age group 13-16 years as this group constitute middle of the adolescent age. By consequential purposive sampling all the 250 students in the 13-16 years were included in the study to find the prevalence of uncorrected refractive errors among students. They were screened for one week for visual acuity from a Standard Snellen Chart. All those suspected case having visual acuity less than 6/12 in one or both eyes were tested for the presence of refractive error by refractionist for confirmation. On pre-informed date educational intervention were given to all the students through power point for better eye care and prevention of the refractive error and live demonstration of simple eye exercise etc. Confirmed cases of refractive error were followed up after one week to check whether they had final visit to ophthalmologist and wearing of the glasses.

## Results:

### Demographic profile:

It was observed that 8% of the children studying in Xth standard were more than 15 year old. Majority of the children (64%) belong to 14-15 years age group, with mean age 14.28 and SD±.84[Table No:1]

**Table: 1 Distribution of the students as per the age:**

| S.N. | Age | No | % |
|---|---|---|---|
| 1 | 13 | 70 | 28 |
| 2 | 14 | 60 | 24 |
| 3 | 15 | 100 | 40 |
| 4 | 16 | 20 | 8 |
| | Total | 250 | 100 |
| Mean age=; 14.28 SD= (±0.84) | | | |

### Profile associated with exposure of risk factors:

In the screening, Total 70 cases were detected with refractive error. Out of them 24 were the new cases that did not have any knowledge for the refractive error in the vision whereas 13 old cases were found to have increased powers that were using spectacles before. Thus prevalence of the uncorrected refractive error was 14.8%. Similar prevalence (12.5%) has been found by S. Matta among adolescent attending the ophthalmology OPD[12].

Bivariate analysis for the refractive error with watching distance for TV, computers, duration of TV watching, prolonged indulgence with computers and study in dim light was done.

In all the variables, significant association was present with children with uncorrected refractive error. But among them, Television watching distance less than 3 m was most significant, followed by less than 1 m watching distance for computers.

In case for prolonged use for computer or video games and for its watching distance Steel et al in 2001 has drawn the conclusion in his study that change in refractive error due to indulgence in videogames / computer is an indirect factor attributed to changing environmental conditions and having higher education, near work related occupation involving computers etc and greatly increased income[13].[Table No:2]

### Final Outcome:

Intervention in the form of health education was given by various means like poster presentation, power point presentation, demonstration of the correct posture and eye exercise. In the follow up visit after one week for the 37 students who had been detected to have uncorrected refractive error, it was found that all new cases (24) had paid a visit to the ophthalmologist for final check up and were wearing the glasses for most of the time. Also 11 students out of 13 had got correction of power after our educational intervention. Rest 2 had plan to visit ophthalmologist in the coming week because of their personal reasons. Also all the children exposed to the health education intervention got emphasis for correct posture and eye exercise and hazards of prolonged exposure to radiation from various sources. They were also made aware for regular screening of the vision for its early correction.

**Table: 2 Distribution of the students in relation to exposure to various risk factors**

| Variables | Refractive Error | | | P value |
|---|---|---|---|---|
| | Yes | No | Total | |
| Watching distance for TV | | | | |
| Less than 3 m | 27 | 40 | 40 | P=0.0000, |
| 3 m or more | 10 | 173 | 173 | (X2) |
| Total | 37 | 213 | 250 | =47.20 |
| | | | | d.f. = 1 |
| Duration of TV watching | | | | |
| 4 hours or less | 13 | 149 | 162 | P=0.0000 |
| More than 4 hr | 24 | 64 | 88 | (X2)=16.75 |
| Total | 37 | 213 | 250 | d.f. = 1 |
| Watching distance for computers | | | | |
| Less than 1m | 29 | 60 | 89 | P=0.0000, |
| 1m or more | 8 | 153 | 161 | X2 = 34.66 |
| Total | 37 | 213 | 250 | d.f. = 1 |
| Studying in dim light | | | | |
| Yes | 30 | 27 | 57 | P=0.0000, |
| No | 7 | 186 | 193 | X2 =8.38 |
| Total | 37 | 213 | 250 | d.f. = 1 |
| prolonged indulgence in computers /videogames | | | | |
| 1-5years | 27 | 109 | 136 | P=0.013, |
| None to less than one year | 10 | 104 | 114 | X2 = 6.03 |
| | | | | d.f. = 1 |
| Total | 37 | 213 | 250 | |

## Discussion and Conclusion:

Every year, India add 2 million blinds in the total pool of blindness[14]. Though prevalence of blindness has declined from 1.12% in 2000 to 1% as per the rapid survey of avoidable blindness conducted in 2006-07. But we are still very much away from the goal of 0.5% prevalence set for year 2010.

In India refractive error is the second most common cause of blindness. It accounts nearly 19.7% for the various causes of blindness. School children form a special group because they are most vulnerable to the effects of reduced vision and its impacts on learning capability and educational potential. It assumes significance due to large number of disability years of every child remaining blind.

The present study shows that in the adolescent age group which forms the high risk group for refractive errors, 14.8% were unaware for the presence of refractive errors in their eyes. Study is also pointing towards the facts that the prevalence of refractive errors is linked to increase watching TV or computer and at closer distance. But it is difficult to point out that it is a cause or effect, therefore further studies are needed to explore on it. But managing the refractive error is the simplest and most effective eye care which can prevent a major group of avoidable blindness.

Moreover, attention should be paid to visual hygiene. While reading illumination should be good and adequately arranged. Posture should be easy and natural. Incorrect posture was reported among 61.2% adolescent by S Matta[12]. Clarity and print should be carefully supervised. An undue ocular fatigue should be avoided. In our study, reading in the dim light was significantly associated with uncorrected refractive error among the students. Therefore, Students need to educate about signs and symptoms of refractive errors. Childhood exposure to night lighting has also been explored in different studies but the results have been mixed. The exact nature and interplay of genetic and environmental factors is not known and data suggest that environmental factors may interact with genetic factors to increase the risks of developing myopia. Future research is needed to identify specific modifiable lifestyle factors and genetic markers for myopia[15].

Uncorrected refractive error is growing up as a major public health problem leading to childhood blindness in India. The unmet need for eye care is increasingly being recognized as a vital component of the total health care delivery system. Therefore, provision must be made for

adequate screening for early detection and prevention of blindness. Community based screening services strategies should be designed which are affordable, available and easily accessible. Though Vision screening is most appropriate strategy to detect early any visual impairment, but school based approach must include teachers orientation also for prevention of eye disease.

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