PREVALENCE OF REFRACTIVE ERRORS IN PRIMARY SCHOOL GOING CHILDREN OF SHEIKH MALTOON TOWN MARDAN

Shafi Ullah[1], Shahana Nisar[1], Uzma Nisar[2], Hamza Abbas[3] Bakhtawara[4]. Nayyer zaman[5],Nizam ud din[6]

ABSTRACT

Objectives: To find out the prevalence of Refractive Errors and its associated risk factors in Primary school children of Sheikh Maltoon Mardan.

Study design: Descriptive Cross sectional Study

Place and Duration of study: This study was conducted in the primary schools of sheikh Maltoon town, Mardan, in the month of April, 2018.

Materials & Methods: A total of 250 students from class 1 to class 5 in five primary schools of Sheikh Maltoon town Mardan, were selected through probability cluster and systemic sampling. Students were interviewed through questionnaire. Near and far vision was tested through Jagger's and Snellen's Chart. Those suspected of having Refractive Errors were called for follow up in MMC Eye OPD. Those diagnosed with refractive errors were then advised glasses.

Results: Out of the total 250 students 55 were suspected for Refractive Errors on the basis of Questionnaire and Examination. 52 students reported to MMC OPD, 7 were found to be normal and 45 had refractive errors. Hence the prevalence of refractive errors came out to be 18% out of which the cases of Myopia, Hyperopia and Astigmatism were 48.8%, 20% and 31.1% respectively.

Conclusion: This research shows that Refractive errors specifically Myopia is very common in school children. Spectacle correction of refractive errors is the cheapest and easy solution of this problem.

Key Words: Hyperopia, Myopia, Risk factors, Accommodation of lens.

INTRODUCTION

The awareness and health education regarding refractive errors should be considered seriously because one of the primary cause of visual impairment especially in children is refractive errors.

This is more common in developing countries. The reason may be unawareness regarding this problem, no access to corrective measures, dietary insufficiency and no proper visual care[1]. There is an easy way to wear affordable glasses by which further visual impairment can be prevented in that person and thus to prevent permanent visual loss.

As there are many predisposing factors that contribute to visual impairment some of them like close reading distance and continuous reading without any gap in between for long time are also associated with development of myopia in children so by emphasizing on the correction of these predisposing conditions can reduce the chances of visual impairment [2] .

CLASSIFICATION OF REFRACTIVE ERRORS

1) Myopia

2) Hyperopia

3) Astigmatism:

Myopia

It is also known as nearsightedness, is a form of refractive error in which parallel rays of light after entering the eye are refracted and instead of focusing on retina it gets focused in front of retina with accommodation at rest .

Hyperopia

[1]Department of Community Medicine, Bacha Khan Medical College, Mardan, Pakistan.
[2](Consultant Radiologist), Armed Forces Institute of Radiology and Imaging, MH, Rawalpindi, Pakistan.
[3]Department of Community Medicine, Gajju Khan Medical College, Swabi, Pakistan
[4]Department of Dentistry, Bacha Khan Medical College, Mardan, Pakistan.
[5]Department of forensic Medicine, Gajju Khan Medical College, Swabi, Pakistan
[6]Department of pharmacology Khyber girls Medical College Hayat Abad, Peshawar

Address for correspondence:
Dr. Shafiullah
Department of Community Medicine Bacha Khan Medical College, Mardan, Pakistan.
Email:shafibkmc82@gmail.com
Cell: 0332-9175568

It is also known as farsightedness, is a form of refractive error in which parallel rays of light after entering the eye gets refracted and instead of focusing on retina it gets focused behind the retina with accommodation at rest.

Astigmatism

Astigmatism is a common vision condition that causes blurred vision. It occurs when the cornea is irregularly shaped or sometimes because of the curvature of lens inside the eye. An irregularly shaped cornea or lens prevents light from focusing properly on the retina.

The effect of outdoor activities like cricket, football, volleyball and many others in spare time of children was observed and compared with those of indoor activities like book reading, use of mobile, Computer tablets etc., it was concluded that children involved in outdoor activities are less likely to develop refractive errors as compared to those involved in indoor activities[3]. When different age Groups were considered to look that which age group is more affected it was observed that myopia (a type of refractive error) is less prevalent in 3-5 years of children and more prevalent in > 6 Years of age group probably due to environmental factors like schooling and associated studying which usually started after 4-5 years of age group[4]. Refractive errors are second leading cause of visual impairment and blindness which are double as compared to that cause by cataract in developing countries[5]. By providing health education and awareness among population the chances of Refractive errors can be reduced significantly. Refractive errors are one of the greatest problems which have affected large population irrespective of age and races[6].

This is one of the major problems if left untreated. It could lead to severe damage to vision and even can cause blindness. It could affect even the mental level of children. They think that they cannot achieve their goals in their lives like other children and they get disappointed and stop their struggle for achieving their goals and thus the person which can be otherwise very fruitful for the society Become a burden on it[7] .In developing countries there is more problem of refractive errors because of their reduced resources which are required for normal vision like lack of food or availability of improper food and also the lack of awareness.

The school age is a growing period physically as well as mentally to transform a child in to a responsible and promising adult. So the earliest we diagnose a problem (disease), more it is easy to handle and solve so that's why our focus is on early age group. In addition to that the problem of refractive error is common in this age, which if undetected can cause an adverse effect on the lives of these individuals[8]. In 2008 a study was conducted on the school going children of Karachi and prevalence of refractive errors was found to be 8.9% among the total 940 students examined[9].

Another study on school students conducted in Lahore in 2007 showed prevalence of 19.8%. This study also showed a positive relationship of refractive errors with family history[10]. A cross sectional study conducted at Al-Shifa Eye trust OPD in 2016 examined 1500 children below the age of 15 years for the presence of different types of refractive errors. In this study astigmatism was found in 41.4%, hyperopia 36.5% and myopia 22.1%[11].

A study on the madrassa students of district Haripur revealed a 41.4% prevalence of refractive errors, out of which Myopia was present in 52.6% of students, Hyperopia 28.4% and Astigmatism 19%[12].Another study conducted in Lahore in 3 public sector schools examined 525 students and refractive errors were found to be present in 21.7% of students and the percentage of Myopia, Hyperopia and astigmatism was 42.5%, 32.9% and 24.6% respectively[13].A study was conducted in a public school of Lahore in 2012 in which 533 students from class 6 to 10th were included. Refractive error was found in 107 student's i.e 20.07%. Myopia accounted for 61.70%, Hypermetropia 14% and Astigmatism 24.30% of the total refractive errors[14].

A school based cross sectional study performed in kotabharu district of Malaysia showed the prevalence of refractive errors to be 7.7% out of which myopia was present in more than 75% of cases[15].

In Nepal 964 school children were examined and refractive errors were found in 62 students (6.4%) in which also myopia was found to be the most common[16].

A cross sectional study in Delhi screened 9884 children for myopia and prevalence of myopia was found out to be 13.1% out of which only 24.7% children were wearing glasses. (Corrected refractive error) [17]. Another research on the subject was carried out in Kolkata among the school children aged 5-10 years. Among 2317 students examined, 25.11% were suffering from refractive errors, myopia being the commonest. No significant difference between refractive errors of boys and girls was found[18].

A study done in Nigeria among children aged between 7-17 years, the observed frequency for hyperopia followed a reverse pattern to that of myopia. The prevalence of hyperopia in the 7 year old subjects was at 26% and continued to decrease with age to 5% among the 17 year old subjects[19].

Rationale

This study was conducted to identify the children who are unaware of their refractive errors and find the prevalence of these refractive errors in Mardan.

MATERIALS & METHODS

This study was conducted in primary schools of sheikh maltoon town Mardan, in April 2018. Mardan is

the second biggest district of KPK in terms of population. Sheikh Maltoon Town is located in the periphery of Mardan, about 7 km outside main city. On one corner of the town is Abdul Wali Khan University and on the other is Bacha Khan Medical College and Mardan Medical Complex. It is clean and green area with around 10 thousand population.

Sample Frame: 18 Primary Schools of Sheikh Maltoon Town Mardan

Population Size: 2298 students Sample Size Formula: Sample size was calculated using WHO sample size calculator, by using the following formula;

$$n = \left[z^2 \times \frac{p \times q}{d^2}\right]$$

Where: n = sample size
z = linked to 95% confidence interval (use 1.96)
p = expected prevalence (as fraction of 1)
q = 1- p (expected non-prevalence)
d = relative desired precision

Sample Size: 250

Sampling technique: Probability sampling was done. Five schools were selected through cluster sampling. In these school's 10 students from each class were selected through lottery method, hence 50 students from all the five schools. Consent was sought from all the students that fulfilled the selection criteria.

Tool for collecting the data: The tool for collecting the data was a modified questionnaire obtained from WHO website and modified according to the need of my study which was verbally translated into Pashto but the answers were written in English.

Ethical consideration: - Informed consent was obtained from each student before their participation in the study and were interviewed after their consent.

Data Analysis: Data was analyzed using SPSS version 20. The data was organized, summarized and displayed through tables and Pie charts. Nominal data was analyzed and presented in the form of frequencies and percentages.

Inclusion Criteria: All primary Students (class 2 to Class5) of Sheikh Maltoon Town Mardan.

Exclusion Criteria: Pre School and Students of Middle School were excluded from the study.

Sampling Frame:

- Dr TM Khan School (122)
- The Educators (133)
- Country Grammar School (127)
- Allied School (132)
- Imperial School (130)
- Dar e Arqam Schools (124)
- Pak School (129)
- Smart School (122)
- Pak Turkish School (121)
- Government Girls Primary School (127)
- Conventional School (126)
- MILS (128)
- Global School (126)
- National School (121)
- Government Primary School #2 (127)
- The NIPS (136)
- Mardan Model School (141)
- Mardan Grammar School (126)
- Total Population: 2298 (clusters=18)

RESULTS

From the total 250 students we suspected 55 students to have decreased vision based on History and Examination (Snellen's and Jagger's charts). We called those 55 students for follow up in MMC Eye OPD. 52 out of these 55 students reported to the OPD. 7 were found to be normal while 45 had refractive errors. Hence the Prevalence came out to be 18%. Out of those 45 students 22 had Myopia (48.8%), 9 had Hyperopia (20%) and 14 had Astigmatism (31.1%).

We divided the students into two age groups; Group A from age 8-10 years, and Group B from age 11-13 years. Total numbers of students in Group A were 219 (83.5%) and that in Group B were 43 (16.4%), as shown in the **figure-1**

In our total sample of 262 student's there were 130 male students (51.9%) and 120 female students (48.1%). Total number of cases in males was 21 compared with 26 in females. This shows that girls had a high percentage of refractive errors compared to boys, as shown in the figure- 2

Students were asked about blurring Of Vision While reading, 54 students said Yes (20.6%), and 208 students said No (79.4%), as shown in the figure-3.

46.3% (25 out of 54) of those who said yes were later diagnosed to have refractive errors. While those who replied No to this question, only 10.5 percent (22 out of 208) of them had refractive errors. This clearly shows that these symptoms are clear indicators of the presence of RE's and shouldn't be ignored by the teachers and parents.

Out of the total sample only 39 students (15%) previously had an eye checkup as shown in figure-4.

Most of the students who were suffering from of Refractive Errors (mild or severe) didn't ever had an

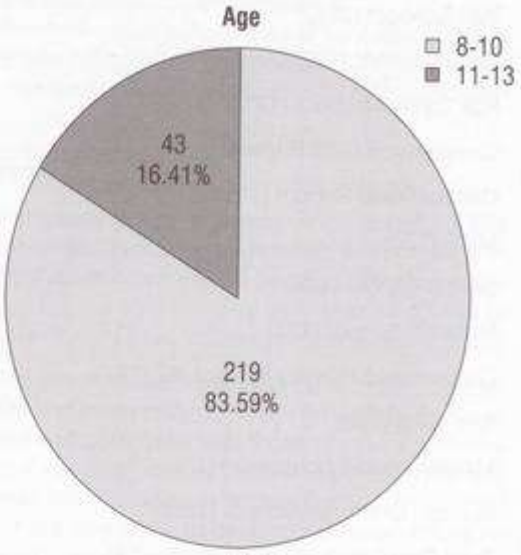

Fig 1

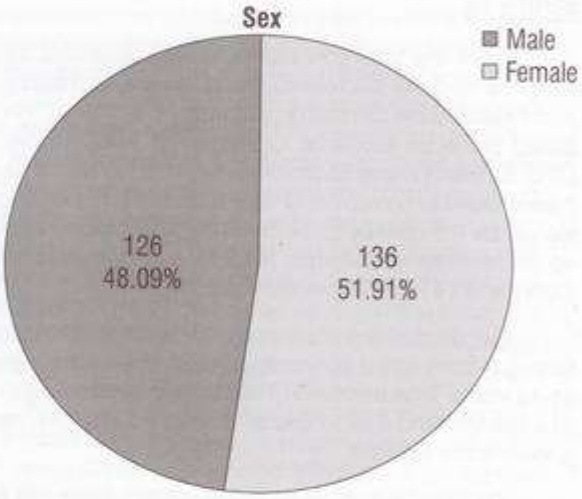

Fig 2

Blurring of vision while reading book

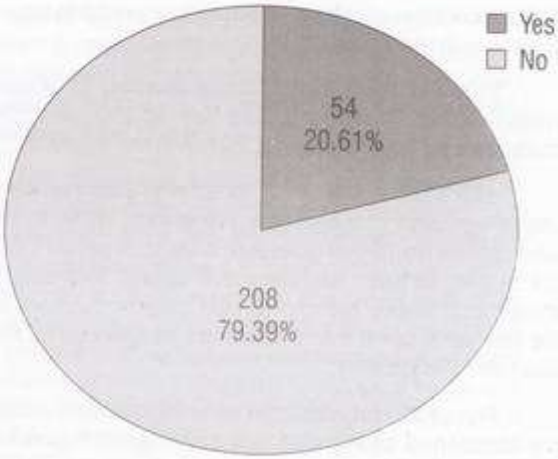

Fig 3

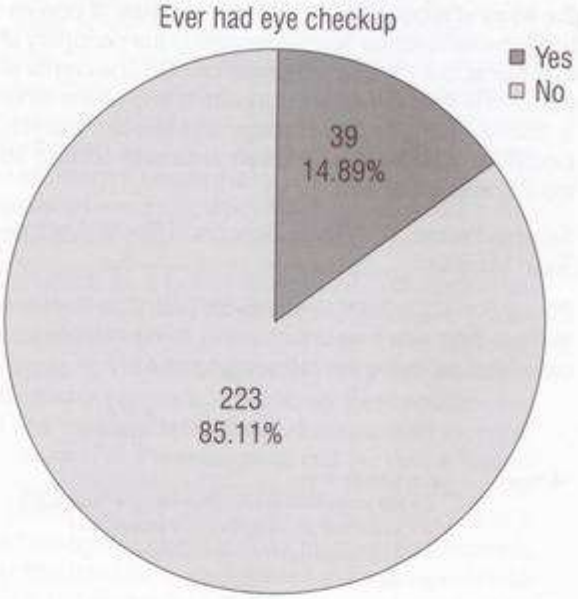

Fig 4

eye checkup and were unaware if they had any ocular disease in the form of Refractive Errors.

136 students experienced pain/irritation in their eyes. As we later analyzed our data we came to know that 24.3% of these students had refractive errors (33 out of 136). While those who didn't felt any pain irritation, 13.4% of them had refractive errors (14 out of 126).

64 students experienced difficulty seeing at night while 198 didn't. Refractive errors were more in the former group (20/64) than in the later (27/198). Those who experienced headache while reading had more percentage of refractive errors than those who didn't experienced headache. This, and the two symptoms discussed before, shows that ocular complaints like "pain/irritation in bright light", "difficulty seeing at night" and "headache while reading" have a positive association with the presence of refractive errors.

DISCUSSION

According to our study, there were more cases of refractive errors in the lower age group, that is age group 8-10 years but in other studies the Refractive errors prevalence increases as the age advances[10]. In 2008 a study was conducted on the school going children of Karachi and prevalence of refractive errors was found to be 8.9% among the total 940 students examined[9]. Young Children in this age group are not able to properly communicate their problem to their parents hence the responsibility lies on parent's shoulders to know if their child has a poor sight and have them clinically checked as soon as possible.

In my study the prevalence of refractive errors came out to be 18%, while in another study on school students conducted in Lahore in 2007 showed preva-

lence of 19.8%[11], however in another study conducted on the school going children of Karachi and prevalence of refractive errors was found to be 8.9% among the total 940 students examined[9].

A cross sectional study conducted at Al-Shifa Eye trust OPD in 2016 examined 1500 children below the age of 15 years for the presence of different types of refractive errors. In this study astigmatism was found in 41.4%, hyperopia 36.5% and myopia 22.1%[11] and in my study cases of Myopia, Hyperopia and Astigmatism were 48.8%, 20% and 31.1%[20].

A study on the madrassa students of district Haripur revealed a 41.4% prevalence of refractive errors, out of which Myopia was present in 52.6% of students, Hyperopia 28.4% and Astigmatism 19%[12].

In Kenya, a study done by Muma et al, revealed that the prevalence of hypermetropia among ages 12-16 years in rural Kenya showed the converse, hypermetropia was found to be the commonest refractive error at 3.2% followed by myopia at 1.7 percent[21].

In South African a study on refractive error and visual impairment in African children found astigmatism was associated with older age[21].

In our total sample of 262 student's there were 130 male students (51.9%) and 120 female students (48.1%). Total number of cases in males was 21 compared with 26 in females. This shows that girls had a high percentage of refractive errors compared to boys. Another research on the subject was carried out in Kolkata among the school children aged 5-10 years. No significant difference between refractive errors of boys and girls was found[19].

The prevalence of Refractive errors should be more in the higher age group because of increased time of exposure to risk factors. We enquired the students about other factors which are the possible risk factors of developing refractive errors like studying in dim light, studying for long continuous hours without rest, and use of electronic devices for long time. All these factors increase the strain on the eyes and are not good for health as illustrated by previous studies[14, 15]. Although in our study we did not find any; relation of these factors with developing Refractive Errors but it is generally advised that reading areas should be well illuminated and classrooms should have adequate lighting. Similarly studying for long hours without any rest is also not advisable.

We asked students regarding taking part in sports activities and surprisingly our results showed no relation between outdoor games and development of refractive errors. But playing Sports and taking part in outdoor activities are obviously healthy for the body. In general including the eyes and vision as shown by previous researches. Similarly regarding eating green vegetables, we couldn't find any relation but it is obvious that these green vegetables contain vitamin A and other essential vitamins which are absolutely important for good vision and children should be encouraged to eat green vegetables.

The risk factors that we were able to identify like posture while reading, dim lighting, continuous study for long hours, less sleep, less physical activity and spending more time on computer and electronic gadgets are also widely accepted and acknowledged as risk factors for developing Refractive Errors[14].

In our last question we tried to find the relation of refractive errors with positive family history and we found out that those having positive family history have a relatively higher chance of developing refractive errors.

CONCLUSION

The prevalence of 18% is quite alarming. In Pakistan, one of the major cause of blindness in uncorrected refractive errors. Refractive errors are usually present in the childhood and continue in the adult life.

Unfortunately they are not given much importance in our society which is evident from the fact that there is no effective system of preschool visual examination of children either in the government or in the private sector.

Recommendations

There should be regular screening for refractive errors in primary and preschool children. Early detection and management can save a child vision from further deterioration and potential blindness. Reading areas should be well illuminated and classrooms should have adequate light. Similarly studying for long hours without any rest should be avoided.

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