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RESEARCH ARTICLE

PREVALENCE OF REFRACTIVE ERRORS IN RURAL AND URBAN SCHOOL CHILDREN – A CROSS SECTIONAL STUDY.

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Abstract

Introduction:-

The quality of life of any person depends on many aspects. One's ability to see things clearly can determine success or failure at work or in school. Normal vision helps a person to lead an independent life, without having to rely on others to fulfill their basic needs.

It has been estimated that about 180 million people worldwide are visually disabled. 45 million of them are blind. Developing countries account for four out of five of the visually disabled. One of the major causes of correctable blindness is refractive error. It has been estimated that refractive errors are prevalent in about 2.3 billion people. Out of these, 1.8 billion people have access for examination of the eyes and proper treatment. The remaining 500 million people have uncorrected refractive errors resulting in impaired vision and blindness.

Refractive errors are the commonest cause of impaired vision and they form the second important cause of treatable blindness in the world next only to cataract.

Refractive error is an intrinsic optical defect where parallel light rays are not focussed on the retina, resulting in a blurred image. Refractive errors develop during childhood and adolescence. If they are not treated children may develop amblyopia or strabismus.

Refractive errors may not only be associated with genetic factors but also with various other risk factors like prolonged near activity like reading, playing video games and watching television or computer for longer duration which considerably reduces the outdoor play time of children. This study has been undertaken to study the prevalence of refractive errors in urban and rural school children in Madurai. It is expected that this study will also give an insight into the magnitude of this problem and create awareness among the common public.

Aim and objectives:-

(i) To find the prevalence of refractive errors in school children aged 10-14 years.
(ii) To compare the prevalence of refractive errors in urban school children with that in rural school children.

Materials and methods:-

A cross sectional school based study was designed with 600 students within the age group of 10-14 years. A total of four schools, two from an urban area and two from a rural area were selected randomly.

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300 students were selected from the schools located in the urban area and another 300 students were selected from the schools located in the rural area.

The principals, teachers and the concerned students were briefed about the study. Prior informed consent for participation in the study was obtained from the parents of these children.

A standardized questionnaire prepared in their local language was used to collect data on their age, sex, parental history of wearing glasses and other environmental factors like watching television, playing video games, outdoor activities and reading books.

Visual acuity (VA) test was performed using Snellen's E chart. Students with visual acuity <6/6 in one or both the eyes were tested for the presence or absence of refractive error by pinhole test. Those showing improvement with pinhole (indicating refractive error) were then subjected to retinoscopy and subjective refraction.

Emmetropia was defined as a spherical equivalent between -0.50 DS and +0.50 DS. A spherical equivalent less than –0.50 DS was taken as myopia. Hypermetropia was defined as a spherical equivalent greater than +0.50 DS. Astigmatism was defined as a cylindrical error less than –0.50 diopter cylinder (DC) in any axis.

Those children with both spherical and cylindrical errors were documented as having the spherical equivalent of myopia or hypermetropia respectively. The children with only cylindrical errors were documented as having astigmatism. Refractive error was categorized into three groups as i) myopia ii) hypermetropia and iii) astigmatism.

The particulars of each student were filled on a structured questionnaire specially designed for this purpose.

The data collected was analyzed by Pearson's Chi Square test using SPSS (Statistical Package for Social Sciences).

Observation:-

Mean age of the 600 children examined was 12.05 years. Out of these children, 297 were boys and 303 were girls.

The results of the analysis are presented in the following table.

TABLE1:- Prevalence of refractive errors in school children.

	Number of children (600)	Percentage
Refractive errors	97	16.2
No refractive errors	503	83.8

The over-all prevalence of refractive errors in school children was found to be 16.2%.

TABLE 2:- Distribution of various types of refractive errors in school children.

Type of refractive error	Number of children	Percentage
Myopia	67	69.1%
Hypermetropia	10	10.3%
Astigmatism	20	20.6%

TABLE 3:- Prevalence of refractive errors in urban and rural school children.

	Refractive errors (97)	Percentage
Urban	62	64
Rural	35	36

p value = 0.015

Out of the 97 children with refractive errors, 62(64%) children were from urban schools and 35(36%) children belonged to rural schools. This difference in prevalence was statistically significant with a p value of 0.015.

TABLE: 4:- Distribution of various types of refractive errors in school children in urban and rural areas.

Type of error	Urban children (62)	Rural children (35)	p value
Myopia (67) (69.1%)	42 (67.7%)	25 (71.4%)	0.066
Hypermetropia (10) (10.3%)	6 (9.7%)	4 (11.4%)	0.758
Astigmatism (20) (20.6%)	14 (22.6%)	6 (17.2%)	0.125

From the above observations it was found that the percentage of myopes was higher in rural areas (71.4%) compared to urban areas (67.7%). Similarly, the percentage of hypermetropes was higher in rural areas (11.4%) compared to urban areas (9.7%). These differences were not significant.

In contrast, astigmatism was more prevalent in urban children (22.6%), compared to rural children (17.2%) though it was not significant was found to be the least common error.

Discussion:-

School children form a vulnerable group affected by visual impairment. **Murthy GVS, Gupta SK, et al.,** have reported in their study that 81.7% visual impairment in school age children had been due to refractive error.

Both the children and their parents fail to recognize the vague symptoms produced by the presence of refractive errors. This creates subsequent detrimental effects on the educational potential, learning ability and the mental health of children.

Once these children leave school, the chances of getting themselves screened for vision is reduced. If diagnosed, refractive error can be treated safely and effectively by simple methods. Hence this study was aimed at school children aged 10-14 years.

In this present study, 97 out of the 600 school children had refractive errors. Of these 97 children with refractive errors, 62 belonged to urban schools and 35 belonged to the rural schools. The increase in the prevalence of refractive errors in urban school children compared to rural school children is statistically significant.

This result is in accordance with the results obtained by **Saw SM et al., 2001.** This higher prevalence of refractive errors in the urban school children may be attributed to a change in life style and improved socioeconomic conditions with increased duration of near work, better education facilities, television and computer usage and reduction in outdoor activities compared to their rural counter parts.

Studies by **Afghani T et al., 2003**, have showed that increasing literacy standards was associated with an increase in prevalence of refractive errors.

Ayub A et al, 2007 found out in his study that there was an increase in prevalence of refractive errors in private sector schools, compared to government sector schools due to presence of the above said similar reasons.

Myopia was found to be the commonest refractive error in our study being **69.09 %** of the total. **Astigmatism** was the next common error forming **20.62%** of the total. **Hypermetropia** was the least common of all the errors contributing **10.31%** of the total.

This is in accordance with the previous studies conducted on this subject by **Hussain** A**B, Ahmed EK** .The prevalence of refractive errors in school age children was 25.32% in their study. They also reported myopia in 63.5%, hypermetropia in 11.2% and astigmatism in 20.4% children.

Study of **Junaid SM et al**, shows an overall refractive error of 10 % in school children. Hypermetropia was present in 58% while myopia was present in 36% children. Astigmatism was identified in 6% children. However their study reported a higher prevalence of hypermetropia than myopia which is contradictory to this present study. Another

study carried out by **Ayub A et al** demonstrated myopia in 43%, hypermetropia in 21.5% and astigmatism in 35.5% children.

Conclusion:-

This study has confirmed the finding of others that there is an increase in the prevalence of refractive errors in children of urban areas compared to those in rural areas. Myopia was found to be the commonest error being followed by astigmatism. Hypermetropia was found to be the least common error.

With the advent of modern gadgets and improvement in technology, children are being constantly exposed more and more to the ill effects of these inventions. With increasing importance being given to academic activities and a reduction in duration of outdoor activities, due precautions must be taken by parents to ensure adequate visual hygiene in children.

Awareness on refractive errors and the importance of wearing glasses in children with refractive errors must be imparted in schools.

During the last few years, steps have been taken by the government to screen children in schools for early identification of refractive errors and their effective management by provision of spectacles.

Adequate screening procedures in schools, maintenance of visual hygiene and providing corrective measures will definitely reduce the burden of this problem in our society.

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