

A Study to Assess the Knowledge on Refractive Errors and Related Risk Factors of School Children in Selected Government Schools, Tirupati.

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Abstract: Eye is a compact organ of sense of sight. Sight is an important indicator of health and quality of life. Eye is the most precious human organ for the function of vision, expression and beauty. Vision is an integral part of effective communication and learning. Good vision is an important part of education. A child's eyes are always use in the classroom for reading, computer usage and chalkboard work.

Aim: To assess the knowledge on refractive errors and related risk factors of school children in selected government schools, Tirupati. To associated the level of knowledge with their selected socio demographic variables regarding refractive errors of school children.

Method: Total 100 samples were taken systematic random sampling technique. Data was collected by structured questionnaire.

Results: majority 73% of moderate knowledge, 17% had adequate knowledge, 10% had inadequate knowledge. There is significant association between knowledge regarding refractive errors and related risk factors of school children with some of the variables like age in years, standard of class, educational status of father and occupational status of the father, occupational status of the mother, at $p < 0.01$ level. Where as, Family income per month, residence, source of information were significant at $p < 0.05$ level. Remaining variables like Gender, religion, educational status of the mother and type of the family were not significant.

Conclusion: based on the obtained findings the researcher prepared a book let which will help them to improve their knowledge on refractive errors.

Key words: Refractive errors, school children, government schools

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I. Introduction

Eye is a compact organ of sense of sight. Sight is an important indicator of health and quality of life. Eye is the most precious human organ for the function of vision, expression and beauty. 85% of the information received from the environment. Vision is an integral part of effective communication and learning. Good vision is an important part of education. Many experts believe 80% of learning is done through a child's eyes. A child's eyes are always use in the classroom for reading, computer usage and chalkboard work. Therefore, education has increased visual requirements especially in children's which disturbs their vision. when a child's vision is not clear it affects mobility, learning, classroom participation and restrict access to information.¹

Child vision is essential for successful learning in school. When the vision suffers, pupil's routine school work and day today activities also get affected. Vision problems were common among school students The students are not mature enough to point out the deficiency at the early stage or the parents have no idea on developing vision problem.²

Normally, the lens focuses light rays directly on the retina, resulting in clear vision: this is called as refraction. Any abnormalities in refraction causes refractive errors is a state in which optical system of the eye fails to adjust to bring parallel rays of light to focus on proper place (fovea). It is a very common eye disorder. Vision problems are one of the common problems among school-age kids. children who have vision problems could not concentrate on studies or on any other extracurricular or recreational activities.³

Refractive error is one of the leading causes of visual impairment in children. Analysis of risk factors for refractive error is required to reduce and prevent this common eye disease. Causes of refractive errors are adenovirus infection, optic nerve infection, ultraviolet radiation, eye disease, environmental factors are lack of

environmental sanitation, Lack of proper ventilation, Area of high radiation, Area of high dust. Refractive errors commonly seen in the children are Myopia, Hyperopia, Astigmatism. Diagnosis of refractive usually done by using Snellen's chart and ophthalmic missionaries and periodical eye examination. Treatment choices for refractive errors are surgical correction, correction by spectacles, LAZER therapy. Vitamin A is the most important for vision, Vitamin A dietary sources are cod liver oil, eggs, milk, orange and yellow vegetables and fruits, green leafy vegetables.⁴⁻⁵

Prevention of refractive errors are avoiding of digital media, consuming vitamin A rich food and regular eye check-ups.⁶

1.2 NEED FOR THE STUDY:

Visual impairment is a significant public health problem. 19 million children are estimated to be visually impaired. Among these children, 12 million are visually impaired due to refractive errors, a condition which could be easily diagnosed and corrected. It is estimated that there are 1.4 million blind children in the world. Two thirds of these live in the developing countries, and of all the blind children 2,70,000 live in India. Uncorrected refractive errors About 13% of Indian population is at the age group of 7-15yrs. By the age of 16years and about 20% of children develop refractive error. Children are the valuable assets of a country. As reported by world health statistics 2014, children under 15years age group constitute 29% of Indian population.⁷

Refractive error is estimated that globally 153 million people over 5years of age are visually impaired as a result of uncorrected refractive errors, of whom 8 million are blind. some 12.8 million in the age group 5-15 years visually impaired from uncorrected or inadequately corrected refractive errors.⁸

Refractive errors among children in Bayelsa state were collected and analysed using the statistical package for social sciences and scientific calculator. One hundred and fourteen children (114) consisting of 72 (63.2%) females and 42 (36.8) males had refractive error. A total of 506 children were seen at the eye clinic within the study period, giving a refractive error prevalence of 22.5%. myopia with 61.4% of cases was the most common type of refractive error. The prevalence of myopia, astigmatism and hyperopia were 13.8%, 6.1% and 2.6% respectively. The highest degree of myopia recorted was-11.0 DS. Compound myopic astigmatism was the most common type of astigmatic error.⁹

In children, the EPP of myopia, hyperopia, and astigmatism was 11.7% (95%), 4.6% (95%), and 14.9% (95%), respectively. The EPP of myopia ranged from 4.9% (95%) in South-East Asia to 18.2% (95%) in the Western Pacific region, the EPP of hyperopia ranged from 2.2% (95%) in South-East Asia to 14.3% (95%) in the Americas, and the EPP of astigmatism ranged from 9.8% in South-East Asia to 27.2% in the Americas. In adults, the EPP of myopia, hyperopia, and astigmatism was 26.5% (95%), 30.9% (95%), and 40.4% (95%), respectively. The EPP of myopia ranged from 16.2% (95%) in the Americas to 32.9% (95%) in South-East Asia, the EPP of hyperopia ranged from 23.1% (95%) in Europe to 38.6% (95%) in Africa and 37.2% (95%) in the Americas, and the EPP of astigmatism ranged from 11.4% (95%) in Africa to 45.6% (95%) in the Americas and 44.8% (95%) in South-East Asia. The results of meta-regression showed that the prevalence of myopia increased from 1993 (10.4%) to 2016 (34.2%) ($P = 0.097$).¹⁰

Refractive error in children in India is a major public health problem and requires concerned efforts from health care workers, educational professional and parents to manage this issue, the overall prevalence's of refractive errors per100 children was 8.0 and in schools it was 10.8 the population based prevalence of myopia, hyperopia, and astigmatism was 5.3%, 4.0%, &5.4% respectively.¹¹

In India as of January 2017, there are 365 million aged < 15 years of age (29 per cent of the population; national profile 2015, published by government of India); therefore,providing vision screening for all children is a daunting task. The availability of eye care services in the country varies between and within regions. Given these disparities, School based vision screening services are considered cost effective in detecting correctable causes of decreased vision. As part of the national program for control of blindness, School vision screening is widely practised at present in the country. Hence, it is necessary to estimate the prevalence both at the community and at the school level to aid planning and implementation of refractive error services in children.¹²

Refractive errors in Andhra Pradesh a total of 4414 children from 4876 households was enumerated and 4074 (92.3%). A population-based cross-sectional analytic study was conducted between October 2008 and September 2009 in Nakhon Pathom. Refractive error, parental refractive status, and hours per week of near activities (studying, reading books, watching television, playing with video games, or working on the computer) were assessed in 377 children who participated in this study.The most common type of refractive error in primary school children was myopia. Myopic children were more likely to have parents with myopia. Children with myopia spend more time at near activities. The multivariate odds ratio (95% confidence interval) for two myopic parents was 6.37 (2.26-17.78) and for each diopter-hour per week of near work was 1.019 (1.005-1.033). Multivariate logistic regression models show no confounding effects between parental myopia and near work suggesting that each factor has an independent association with myopia.Statistical analysis by logistic

regression revealed that family history of refractive error and hours of near-work were significantly associated with refractive error in primary school children.¹³

Refractive error is an optical defect of the eye that prevents light from being brought to a sharp focus by the cornea and lens onto the retina. Refractive error is a major contributor to visual impairment which is a significant cause of morbidity in children worldwide (ager, 1998; Gilbert and Foster, 2001). Refractive error among the priority diseases listed in the vision 2020; “theRight to Sight” initiative of the world health organization (WHO) for the elimination of avoidable blindness in childhood. WHO estimates that worldwide, 1.2 million children aged between 5 to 15 years are visually impaired because of uncorrected refractive errors conditions that could be easily diagnosed and corrected with glasses and contact lenses (Dandona et al.,1999a). Global estimates by the WHO on visual impairment and its causes in 2010, reported uncorrected refractive error (43%) as the major cause of visual impairment (Pascolini and Mariotti, 2012).¹⁴

The visual experience of a child plays a significant role in his/her psychological, physical and intellectual development. Uncorrected refractive error is common cause of abnormal visual experience that leads to amblyopia (impaired or dim vision without obvious defect or change in the eye or sometimes called lazy eye). Children with uncorrected refractive error need to be treated early as delay in treatment can lead to amblyopia. Without appropriate optical correction, millions of children are losing educational opportunities (WHO, 2006). Early detection of a vision problem can have educational, behavioural and certainly, quality of life benefits.¹⁵

During my RHC clinical postings, it was observed majority of school children were suffering from refractive errors. Then I felt that there is a need to assess the knowledge of school children about refractive errors and issue the information booklet. So that they improve their knowledge.

II. Methodology

- **Research approach:** Non- experimental research approach
- **Study design:** Descriptive research design
- **Population:** School children who were studying in government schools of Tirupati.
- **Sample:** who are studying S.V Government High School Tirupati.
- **Sample size:** 100 school children
- **Sampling technique:** Systematic random sampling technique

INCLUSION CRITERIA:

Children who were

- ▶ Willing to participate in the study.
- ▶ Studying in government school, Tirupati.
- ▶ Available at the time of data collection.
- ▶ With the age group of 11-14 years.
- ▶ Able to communicate English and Telugu.

EXCLUSION CRITERIA:

Children who

- ▶ Were studying other than S.V Govt school.
- ▶ Were aged less than 11 years and more than 15 years.
- ▶ Were physically and mentally compromised.

PROCEDURE FOR DATA COLLECTION

- ▶ The investigator initially established rapport with the study subjects and explained the purpose of the study. Consent from the subjects was obtained and confidentiality was maintained throughout the study.
- ▶ The investigator collected the data by using self-administered questionnaire from 10am to 1pm among 100 students.

PLAN FOR DATA ANALYSIS

Descriptive statistics:

- **Frequency**
- **Percentage**
- **Mean and standard deviation**

Inferential statistics:

- Chi-Square test was used to identify the association between knowledge of refractive errors and related risk factors among school children with their selected demographic variables.

III. Results

Section-1

Table 1: Frequency and percentage of demographic variables among school children

S.NO	Socio-Demographic variables	Frequency	Percentage
1	Age in year	25	25%

		b) 12 years	24	24%
		c) 13 years	25	25%
		d) 14 years	26	26%
2	Gender	a) Male	57	57%
		b) Female	43	43%
3	Standard of class	a) 6 th class	27	27%
		b) 7 th class	23	23%
		c) 8 th class	26	26%
		d) 9 th class	24	24%
4	Religion	a) Hindu	68	68%
		b) Muslim	18	18%
		c) Christian	14	14%
5	Family income per month	a) 3000	17	17%
		b) 3001-5000	21	21%
		c) 5001-7000	8	8%
		d) 7001-9000	27	27%
		e) Above 9000	27	27%
6	Educational status of the father	a) Illiterate	22	22%
		b) Primary education	23	23%
		c) Secondary education	27	27%
		d) Graduate	28	28%
7	Educational status of the mother	a) Illiterate	41	41%
		b) Primary education	25	25%
		c) Secondary education	19	19%
		d) Graduate	15	15%
8	Occupational status of the father	a) Business	19	19%
		b) Unemployee	7	7%
		c) Employee	25	25%
		d) Agriculture	20	20%
		e) Daily wage worker	29%	29%
		f)		
9	Occupational status of the mother	a) Business	9	9%
		b) House wife	31	31%
		c) Employee	8	8%
		d) Daily wage worker	34	34%
		e) Agriculture	18	18%
10	Residence	a) Rural	41	41%
		b) Urban	55	55%
		c) Urban slum	4	4%
11	Types of the family	a) Nuclear	42	42%
		b) Joint	40	40%
		c) Extended	18	18%
12	Source of information	a) Books	39	39%
		b) Television	32	32%
		c) News paper	17	17%
		d) Others	12	12%

INTERPRETATION:

Table shows that out of 100 school children, 26(26%) of the school children belongs to the age group of 14 years, followed by 25(25%) belong to the age group of 13 and 11 years, followed by 24(24%) belongs 12 years.

Considering to Gender, it shows that 57(57%) of the school children were males, and 43(43%) of them were females.

Regarding standard of class 27(27%) of the school children were studying to 6th class, 26(26%) studying to 8th class, 24(24%) studying to 9th class and 23(23%) of school children were in 7th class.

Regarding religion 68(68%) of school children belongs to Hinduism, 18(18%) belongs to Muslims, 14(14%) of them chosen Christianity.

With respect to family income per month, 27 (27%) of the school children families had monthly income of Rs: 7001-9000 above, 21(21%) of them had income of Rs:3001-5000, 17(17%) of them had income of Rs: 3000, 8(8%) of them had income of Rs: 5001-7000.

Pertaining to the educational status of the father, 28(28%) of them were graduates, 27(27%) of them had secondary education, 23(23%) of them had primary education, 22(22%) of them were illiterates.

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Pertaining to the educational status of the mother, 41 (41%) of them were illiterates, 25(25%) of them had primary education, 19(19%) of them had secondary education, 15(15%) of them were graduates.

With regards to the occupational status of father, 29(29%) of them were daily wage workers,25(25%) of them were employees, 20(20%) of them were agriculture workers,19(19%) of them were business people and 7(7%) of the them were unemployed.

With regard to the occupational status of the mother, 34(34%) of them were daily wage workers,31(31%) of them were house wife's, 18(18%) of them were doing agriculture, 9(9%) of them were doing business and 8(8%) of them were employees.

Regarding residence of living 41(41%) of them residing at rural areas 55(55%) of them residing at urban areas and only 4(4%) of them residing in urban slums.In relation to type of the family, majority 42(42%) of the school children belongs to nuclear family, 40(40%) of them belongs to joint family and remaining 18(18%) of them belongs to extended family.

On considering source of information, 39(39%) of the school children were getting information through books, 32(32%) of them getting information through television, 17(17%) of them getting information through newspaper remaining 12(12%) of them were getting information through other sources.

SECTION-II

Table 2 : Distribution of knowledge levels of refractive errors And related risk factors of school children

N= 100

S.NO	Area of knowledge	Level of knowledge					
		inadequate		moderate		adequate	
		f	%	F	%	F	%
1	Knowledge	10	10%	73	73%	17	17%

The above table reveals that out of 100 school children 73(73%) had moderate knowledge 17(17%) had adequate knowledge and 10(10%) had inadequate knowledge regarding refractive errors and related risk factor.

Table 2 : Distribution of knowledge levels of refractive errors And related risk factors of school children

N= 100

S.NO	Area of knowledge	Level of knowledge					
		inadequate		moderate		adequate	
		f	%	F	%	F	%
1	Knowledge	10	10%	73	73%	17	17%

The above table reveals that out of 100 school children 73(73%) had moderate knowledge 17(17%) had adequate knowledge and 10(10%) had inadequate knowledge regarding refractive errors and related risk factor.

SECTION-III

Table 3: Distribution of Mean and standard deviation for level of knowledge regarding refractive errors and related risk factors of school children.

S.NO	N	MEAN	STANDARD DEVIATION
Knowledge levels regarding refractive errors	100	21.60	3.528

The above table reveals that mean and standard deviation levels of knowledge regarding refractive errors and related risk factors of school children were 21.60 and 3.528.

SECTION-IV

Table 4: Association between socio-demographic variables with knowledge regarding refractive errors and related risk factors of school children.

s.no	socio demographic variable		Knowledge			χ ²	df	P value	
			adequate	moderate	Inadequate				
1	Age in years	11 years	N	4	21	0	29.831** Table value (16.812)	6	0.000
			%	4.00%	21.00%	0.00%			
		12 years	N	6	14	4			
			%	6.00%	14.00%	4.00%			
		13 years	N	0	23	2			
			%	0.00%	23.00%	2.00%			
		14 years	N	0	15	11			
			%	0.00%	15.00%	11.00%			
2	Gender	Male	N	7	41	9	0.825 Table value (5.991)	2	0.662
			%	7.00%	41.00%	9.00%			
		Female	N	3	32	8			
			%	3.00%	32.00%	8.00%			

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3	Standard of class	6 th class	N	4	32.00%	8.00%	29.538*	6	0.000
			%	4.00%	21.00	2.00			
		7 th class	N	6	16	1			
			%	6.00%	16.00%	1.00%			
		8 th class	N	0	23	3			
			%	0.00%	23.00%	3.00%			
9 th class	N	0	13	11					
	%	0.00%	13.00%	11.00%					
4	Hindu	Hindu	N	6	49	13	5.207	4	0.267
			%	6.00%	49.00%	13.00%			
		Muslim	N	4	12	2			
			%	4.00%	12.00%	2.00%			
		Christian	N	0	12	2			
			%	0.00%	12.00%	2.00%			
5	Family income per month	Rs3000	N	2	11	4	19.680*	8	0.012
			%	2.00%	11.00%	4.00%			
		Rs3001-5000	N	3	18	0			
			%	3.00%	18.00%	0.00%			
		Rs5001-7000	N	1	7	0			
			%	1.00%	7.00%	0.00%			
Rs7001-9000	N	2	23	2					
	%	2.00%	23.00%	2.00%					
Above Rs9000	N	2	14	11					
	%	2.00%	14.00%	11.00%					
6	Educational status of the father	Illiterates	N	3	19	0	21.930**	6	0.001
			%	3.00%	19.00%	0.00%			
		Primary education	N	2	17	4			
			%	2.00%	17.00%	4.00%			
		Secondary education	N	4	22	1			
			%	4.00%	22.00%	1.00%			
Graduates	N	1	15	12					
	%	1.00%	15.00%	12.00%					
7	Educational status of the mother	Illiterates	N	4	33	4	24.776	6	0.000
			%	4.00%	33.00%	4.00%			
		Primary Education	N	6	16	3			
			%	6.00%	16.00%	3.00%			
		Secondary education	N	0	17	2			
			%	0.00%	17.00%	2.00%			
Graduates	N	0	7	8					
	%	0.00%	7.00%	8.00%					
8	Occupationa-l status of the father	Business	N	2	17	0	30.456**	8	0.000
			%	2.00%	17.00%	0.00%			
		Unemployee	N	1	6	0			
			%	1.00%	6.00%	0.00%			
		Employee	N	1	11	13			
			%	1.00%	11.00%	13.00%			
Agriculture	N	3	16	1					
	%	3.00%	16.00%	1.00%					
Daily wage workers	N	3	23	3					
	%	3.00%	23.00%	3.00%					
9	Occupationa-l status of the mother	Business	N	1	7	1	29.656**	8	0.000
			%	1.00%	7.00%	1.00%			
		Housewifes	N	2	27	2			
			%	2.00%	27.00%	2.00%			
		Employee	N	0	2	6			
			%	0.00%	2.00%	6.00%			
Daily wage workers	N	3	28	3					
	%	3.00%	28.00%	3.00%					
Agriculture	N	4	9	5					
	%	4.00%	9.00%	5.00%					
10	Residence	Rural	N	7	33	1	12.830*	4	0.012
			%	7.00%	33.00%	1.00%			
		Urban	N	3	37	15			
			%	3.00%	37.00%	15.00%			
		Urban slum	N	0	3	1			
			%	0.00%	3.00%	1.00%			
Nuclear	N	8	27	7					
	%	8.00%	27.00%	7.00%					
Joint	N	2	31	7					
	%	2.00%	31.00%	7.00%					

			%	2.00%	31.00%	7.00%	(9.488)		
		Extended	N	0	15	3			
			%	0.00%	15.00%	3.00%			
12	Source of information	Books	N	2	31	6	12.632* Table value (12.592)	6	0.049
			%	2.00%	31.00%	6.00%			
		Television	N	1	23	8			
			%	1.00%	23.00%	8.00%			
		News paper	N	3	12	2			
			%	3.00%	12.00%	2.00%			
		Others	N	4	7	1			
			%	4.00%	7.00%	1.00%			

Table 4: shows that there was a significant association between knowledge regarding refractive errors and related risk factors of school children with some of the variables like age in years, standard of class, educational status of father and occupational status of the father, occupational status of the mother, at $p < 0.01$ level. Where as, Family income per month, residence, source of information were significant at $p < 0.05$ level. Remaining variables like Gender, religion, educational status of the mother and type of the family were not significant.

IV. Discussion

This chapter deals with discussion part according to the results obtained from statistical analysis based on the data of the study. The reviewed literature and the hypothesis based on the data of the study reveals the facts about knowledge of refractive errors and related risk factors of school children.³⁸

The present study mainly focused to assess the knowledge of refractive errors and related risk factors of school children. The problem statement of this study was “**Assess the knowledge on refractive errors and related risk factors of school children in selected government schools Tirupathi**”

100 school children were selected by using systematic random sampling technique and used a cross sectional descriptive design. Self administered questionnaire was used to assess the level of knowledge regarding refractive errors and related risk factors of school children. The discussion of the present study is based on the findings obtained from the descriptive statistical analysis of the collected data.

1. The first objective of the study was to assess the knowledge on refractive errors and related risk factors of school children.

The present study showed that among 100 school children, 73% were having moderate knowledge, 17% were having adequate knowledge, 10% were having inadequate knowledge.

The result of the present study can be supported by the result of a study was conducted to assess the knowledge, attitude among school children in Gondar city, Northwest Ethiopia. The study revealed that out of 565 study participants 55.9% had good knowledge and 57.2% had favorable attitude towards refractive errors. History of spectacle use, history of eye examination, training on eye health and 11-20 years of experience were positively associated with knowledge whereas gender, older age, 31-40 years of experience, private school type and 5th, 8th teaching category were associated with attitude. The study concludes that knowledge and attitude of study subjects were low which needs training of school children about the refractive error.

2. The second objective of the study was to find out the association between knowledge on refractive errors and related risk factors of school children with their selected socio demographic variables

Age in years, standards of class, educational status of father, occupational status of the father, occupational status of the mother, were significant at $p < 0.01$ level, where as Family income per month, residence and source of information, were significant at $p < 0.05$ level. Gender, religion, educational status of the mother, type of the family were not significant.

These results can also be supported with the previous study which was conducted to assess factors associated with refractive errors among school children in rural field practice Area of Tertiary care Hospital, Bangalore. In this study 1140 study participants were examined where the mean age was 11.28 years. The prevalence of refractive errors was 10.5%. and it was significantly associated with age $p < 0.05$. The association between family history and refractive errors was statistically significant at $p < 0.01$. The study concludes that the prevalence of refractive errors, especially myopia, was higher in older children which causes higher prevalence and barriers to refractive error correction services and compliance should be identified and addressed. Eye screening of school children is recommended. 40

V. Conclusion

In this study, most of the school children 10(10%), had inadequate knowledge, 73(73%) had moderate knowledge, 17(17%) adequate knowledge regarding refractive errors and related risk factors. There was a

significant association between some of the demographic variables like occupational status, and the level of knowledge regarding refractive errors and related risk factors of school children at $p < 0.01$.

These findings suggested that extensive health education were needed to bring awareness among school children. So nurses need to encourage life style modifications by organizing health education programs on refractive errors and related risk factors of school children to bring down morbidity, disability to build fruitful community. Hence the researcher distributed the information booklets to the sample their improvement of knowledge.

VI. Recommendations

- ❖ A similar study can be conducted to compare children in urban area.
- ❖ A comparative study can be conducted to assess knowledge of refractive errors among male and female adults.
- ❖ A study can be conducted to assess the effectiveness of structured teaching programme on knowledge regarding prevention of the refractive errors.
- ❖ A large scale survey can be conducted to assess the incidence of refractive errors.
- ❖ A similar study can be conducted to assess knowledge regarding refractive errors among health personnel in the community.
- ❖ Field trails can be conducted to improve the knowledge on refractive errors and related risk factors among all categories of people in the community.
- ❖ A similar study can be conducted on large sample for better generalization.

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