Socio Demographic Profile of High School Children with Myopia: A Comparative Study between Government and Private Schools in Hyderabad City.

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Abstract: *Myopia is considered as one of the important public health problems, especially in the urban population in India. The aim of this study is to know the prevalence of myopia in high school children of 13-15 years age group and to assess the socio demographic features among myopia children by comparing between Government and Private schools. This is a Institutional based cross sectional study done from November 2013 to October 2014 in Government and Private High Schools at Harazpenta. Various Study tools were used to detect refractive errors. Among the study population (1600), prevalence of myopia was found to be 23.18% and it was 20.6% and 25.7% in government and private schools respectively. Age of detection of myopia in majority of cases were between 9-12 years in government schools, and in private schools majority of cases were less than 8 years of age group. Majority of the study population both in government and private schools belongs to Below Poverty Line (72.6%) followed by Above Poverty Line (27.4%). All the children irrespective of family history of myopia has to screen for refractive errors. Detection of myopia by school health campaigns is more useful for mass screening and early diagnosis.*
Keywords: *Myopia, School Children, Government and Private Schools.*

I.   Introduction

School going years is considered as the wonder years in a person's life. These years are also the formative year which determines one's physical, intellectual and behavioural development. Any problem in the vision during the formative years can hamper the intellectual development, maturity and performance of a person in future life.

Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. Inclusion of uncorrected refractive error would increase estimates of the worldwide prevalence of visual impairment by 61% [1]. Patterns emerging from epidemiological research indicate that the prevalence of myopia is increasing in economically developed societies worldwide [2]. Particularly in East-Asian populations such as China, Hong Kong, Japan, Singapore and Taiwan [3] where the magnitude of this increase has led some researchers to suggest that East-Asia is host to a myopia epidemic [4]. Although, the prevalence of myopia varies by the country, age and by ethnic group it is a major cause of visual impairment in both the developed and the developing world [5]. The prevalence of myopia has been reported to be as high as 70-90% in some Asian population with Taiwan reporting a myopic prevalence of 84% among 16-18 years old high school students [6,7].

About 13% of Indian population is in the age group of 7-15yrs and about 20% of children develop refractive errors by the age of 16 years [8].

Due to the high magnitude of uncorrected refractive errors, myopia is considered as one of the important public health problems, especially in the urban population in India. It has been given high priority under the National Programme for Control of Blindness. The school vision-screening programme is fully sponsored by the Government of India and free spectacles are provided to poor children. The programme is aimed to eliminate blindness due to refractive error by providing refractive error services at primary level with the availability of qualified paramedical ophthalmic assistants in the vision centre for every 50,000 population by the year 2020 [9].

The aim of this study is to know the prevalence of myopia in high school children of 13-15 years age group and assess the socio demographic features among myopia children by comparing between Government and Private schools.

II.   Materials And Methods

This is a Institutional based cross sectional study done from November 2013 to October 2014 in Government and Private High Schools at Harazpenta which is the urban field practice area of Osmania Medical

College, Hyderabad. Ethical clearance was taken from the Institutional Ethical Committee, Osmania Medical College, Koti and Hyderabad.

2.1.Inclusion Criteria
All the children in the age group of 13- 15 years of selected schools of urban field practice area who were on the day of the interview.

2.2.Exclusion Criteria
Children with defective vision due to other reason

2.3.Sample size
The sample size was calculated as follows:

$N = 4pq/l^2$

Where,
* N = Number of participants included in the study
* p = Prevalence of myopia in school going children in the age group of 13-15 years (taken as 23%)[10]
* q = 100-p (77)
* l = Allowable relative error, here taken as 10% of p i.e., 2.3

Hence, the sample size is

$N = \dfrac{4 \times 23 \times 77}{(2.3)^2}$

= 1339

Non response rate taken as 15%, hence the final sample size is 1540 rounded to 1600.

2.4. Study Tools
1. Snellen's chart- for testing visual acuity
2. Opaque disc perforated by small central hole- to conduct pin hole test
3. Occluder- used for each eye testing separately
4. Retinoscope – a trial box, a trial frame, self illuminated vision box, streak Retinoscope.

2.5. Data Collection
Using pretested pre designed questionnaire information was obtained from the children. The students were asked to fill the questionnaire in the presence of the investigator which was explained to them one day before the study. General data regarding socio demographic factors, family history pertaining to refractive errors and vitamin A deficiency, their life style activities involving near work activity were collected.

2.6. Visual acuity was tested using Snellen's chart
The details of students with poor vision were noted down in a separate register. The schools were revisited with a refractionist on a pre fixed date. All the students with poor vision were examined by the refractionist. Objective refraction was performed with Streak Retinoscope which was followed by subjective refraction till the best corrected visual acuity was achieved. Children already wearing spectacles were also examined and change in power was noted. Children with other ocular problems were referred to Dr. Sarojini Devi Eye Hospital, Hyderabad.

2.7.Data Analysis
Data was entered in Microsoft Excel 2007 and analysis was done using the Epi Info version 7. Data was summarized in percentages and proportions . The difference was considered to be statistically significant if $p < 0.05$.

III.   Results
A cross sectional study was undertaken in selected schools of urban field practice area of Osmania Medical College to know the prevalence of myopia in high school children of 13-15 years age group and to assess the socio demographic features among myopia children by comparing between Government and Private schools.

A total of 1600 study population, 800 of each were taken from government and private schools. Among the study population mean age was 13.7 years.

Out of 413 refractive errors detected by the investigator, 371 were confirmed as myopia by the refractionist. Among the study population (1600), prevalence of myopia was found to be 23.18% and it was

20.6% and 25.7% in government and private schools respectively (Table 1). The association between myopia cases and type of school was significant (p=0.01).

Among various refractive errors Myopia was predominant about 90%, followed by Astigmatism (6%) and Hypermetropia (4%) in both Government and Private schools.

Higher prevalence of Myopia was seen in the age of 14 years both in Government and Private schools. The difference in age wise prevalence was statistically significant (p<0.001) (Table 2).

It was observed that among total study population boys were more (55%) compared to girls (45%). Boys were more (60.3%) in government schools compared to private schools (49.7%). The prevalence of myopia was more in girls (62.3%) compared to boys (37.7%), but this difference was statistically not significant (p = 0.07) (Table 3).

Among the study population the age of detection of myopia in majority of cases were between 9-12 years in government schools, and in private schools majority of cases were less than 8 years of age group. The association between age at detection of myopia and type of school was found to be statistically significant (p < 0.001) (Fig.1).

Majority of the study population both in government and private schools belongs to Below Poverty Line (72.6%) followed by Above Poverty Line (27.4%) (Fig. 2).

In study population majority in Government and private schools had family history of myopia in single parent (48%), followed by no family history of myopia (28%) (Table. 4). The association between family history of myopia and cases detected with myopia was found to be statistically significant (p = 0.03).

IV.   Discussion

School health is an important branch of community health. According to modern concepts, school health service is an economical and powerful means of raising community health.

The prevalence of myopia varies with time and the age of the study population. National Health and Nutrition Examination Survey (NHANES) in 1971 and 1972, the prevalence of myopia in the United States was estimated to be 25%[11]. Various surveys in India have found myopia prevalence's ranging from 6.9 % to 19.7% [12,13].

3.1.Prevalence of Myopia

Among 1600 studied children, prevalence of myopia was found to be 23.18% and it was 20.6% and 25.7% in government and private schools respectively in this study. In Line with this Study Afroz Khan et al [10]and Jabeen Rohul et al [14]observed the prevalence of Myopia, was found to be 23.08% and 27.63% respectively. In Contrast to this study lesser prevalence of Myopia was observed by Kalkivayi et al[15] and Dandona et al [16], which was found to be 10%, 8.6% and 4.44% respectively.

3.2. Age wise distribution of Myopia

In the present study, majority (45%) of myopic children were in the age of 14 years both in government and private schools. Sapkota YD et al (2007) [17] found that myopia increased from 9.5% in 5th grade to 26.8% in 9th grade and Y.S.Khader et al (2006) [18] found lowest for the youngest age group (7.8%) and increased until it reaches 20.6% for 14 years children. After that age, prevalence decreased gradually.

Lin LK et al (2000) [19] observed that prevalence of myopia as 20%, 61%, 81% among the school children in the age 7, 12 and 15 years respectively and Kalkivayi v et al (1997) [15] observed the prevalence of myopia was found to be significantly higher among children aged > 10 years compared to those < 10 years (P<0.001).

3.3. Gender

Out of the total 371 myopic children, 231 (62.3%) were girls and 140 (37.7%) were boys in this study. Association between gender and myopia was found to be statistically significant (P<0.0000001). Ishfaq Ahmed et al (2008) study on "Prevalence of Myopia in students of Srinagar City of Kashmir, India" found that girl students were more likely to have myopia than boys (OR=1.52) [20].

Mohammed Khalaj et al (2003) [21] in Qazvin city found that myopia was more prevalent in girls (60%) than in boys (40%) (P<0.005) and Luke LL et al (2001) [19] observed that prevalence of myopia was 64% for girls.

3.4. Socio Economic Status

It was observed that majority of the myopic children (83%) in Government schools were of below poverty line compared to private schools which was statistically significant (p = 0.0001). Ishfaq Ahmed et al (2008) [20] found that students from low socio economic conditions were having higher prevalence of myopia than their counterparts from higher socio economic status.

3.5. Age at detection of myopia

Among the study population the age at detection of myopia in majority of myopic children was between 9-12 years in government schools and in private schools less than 8 years of age group. The association between age at detection of myopia and type of school was found to be statistically significant (p < 0.001).

Study done by Luke LL (2001) [19] in Taiwan found that the age of onset of myopia decreased from 12 years old in 1983 to 8 years old in 2000.

3.6. Family History

In studies done by Jabeen Rohul (2013) [14], Jenny et al (2008) [22] and YS.Khader et al (2006) [18] found that among myopic children, 39.9%, 58.5% and 56.4% respectively had a family history of myopia.

V.   Figures And Tables

Table 1: Distribution of myopia among study population (n=1600)

Type of refractive error	Government school (n=800)	Private school (n=800)	Total(n=1600)	%
Myopia	165 (20.6%)	206 (25.7%)	371	23.2
No myopia	635 (79.4%)	594 (74.3%)	1229	76.8
Total	800 (100%)	800 (100%)	1600	100

Chi square = 5.899,   Degree of freedom (df) = 1,   P = 0.01

Table 2: Distribution of myopia according to age in Government and private schools (n=371)

Age in Years	Government Schools		Private Schools		Total	
	Number	%	Number	%	Number	%
13 yrs	38	23	79	38.3	117	31.5
14yrs	82	49.7	85	41.3	167	45
15yrs	45	27.3	42	20.4	87	23.5
Total	165	100	206	100	371	100

Chisquare = 10.12, df = 2, P = 0.006

Table 3: Gender wise distribution of myopia cases in Government and private schools (n=1600)

| Gender	Government School		Private School		TOTAL	
	Number	%	Number	%	Number	%
Boys	54	32.7	86	41.7	140	37.7
Girls	111	67.3	120	58.3	231	62.3
Total	165	100	206	100	371	100

Chi square = 3.173, df = 1, P value = 0.07

Table 4: Family history of myopia among study population

Family History	Government school		Private school		Total	
	Number	%	Number	%	Number	%
No family History	46	27.9	58	28.2	104	28
Both parents Myopic	17	10.3	18	8.7	35	9.4
Single parent myopic	69	41.8	109	52.9	178	48
Sibling	33	20	21	10.2	54	14.6
Total	165	100	206	100	371	100

Chi square = 8.643, df = 3, P value = 0.03

Fig. 1 : Distribution of study population based on Socio Economic Status
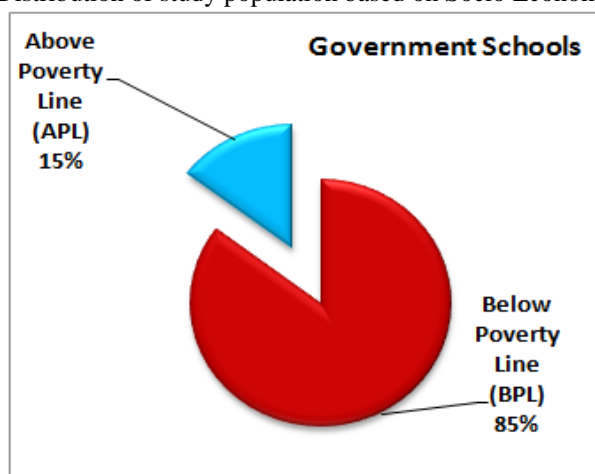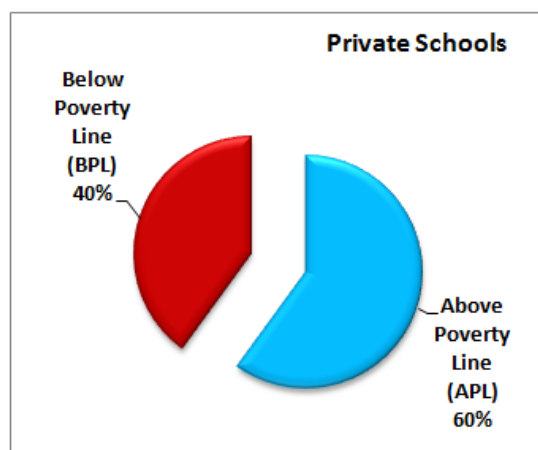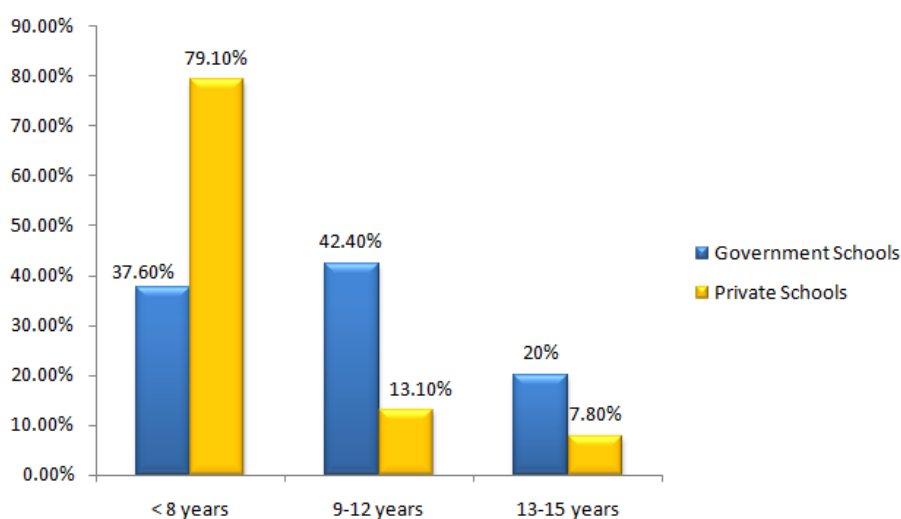
Fig. 4: Age at detection of myopia among total myopia cases

VI.   Conclusion

Most refractive errors are easily treatable by appropriate refractive correction. High refractive error in childhood may lead to amblyopia, resulting in permanent vision loss. Myopia is becoming a major global health problem for school children. There is a need to screen the children from 8 years of age, as myopia occurring in young age people have bad prognosis. All the children irrespective of family history of myopia has to screen for refractive errors. Detection of myopia by school health campaigns is more useful for mass screening and early diagnosis. In spite of many efforts to improve school health, it must be stated that in India, as in other developing countries, the school health services provided are hardly more than a token service because of shortage of resources and insufficient facilities.

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