

Original Research Article

Awareness and knowledge about refractive errors and strabismus in South Indian population

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ABSTRACT

Background: To assess the awareness, knowledge about refractive errors and strabismus among the general public in southern Indian states of Andhra Pradesh and Telangana.

Methods: A cross sectional population-based survey used a semi structured questionnaire on awareness, knowledge on refractive errors and strabismus done as part of knowledge, attitude and practices study (KAP). Stratified multistage cluster random sampling method was used with a sample size of 867 adults- ≥16 years. Having heard of refractive error and strabismus was defined as awareness and having knowledge of the type of error for which spectacles were worn, was considered as knowledge. A pilot study was conducted to validate the questions used in the main study. Statistical package SPSS (version 19) was used for analysis to calculate logistic regression and odds ratios for gender, age, education and urban-rural areas.

Results: A total of 782/867 (90.1%) subjects participated in the survey with females 47.4%. 581 subjects (74.3%) were aware of refractive error. 690 subjects (88.2%) were aware of squint. With multiple logistic regression about awareness of refractive error to various variables, subjects who were educated 11th class to degree had a higher awareness (OR: 2.40; CI: 1.25-4.60). With multiple logistic regression about awareness of squint to various variables, females had a higher awareness of squint (OR: 1.98; CI: 1.19-3.31).

Conclusions: Awareness of squint and refractive error was high among the general public, but the knowledge of it was limited.

Keywords: Awareness, Knowledge, Refractive errors, Squint, General public

INTRODUCTION

Awareness and knowledge of common eye diseases play an important role in encouraging people to seek treatment for eye problems.¹ Global estimates indicate that more than 2.3 billion people in the world were suffering from poor vision due to refractive error (RE).² RE's are the most common forms of eye disorders that result in poor vision and have several social and economic implications if uncorrected.³ Uncorrected RE's is one of the major causes of avoidable blindness and low vision. A number of factors are responsible for uncorrected RE's. They are the lack of awareness of the problem, inability to recognize the problem at personal and family level, non-

availability and non-affordability of the pediatric eye care services, and the cultural disincentives to compliance.⁴ Uncorrected RE's can result in amblyopia and strabismus. It can restrict progress in education, limit career opportunities and restrict access to information.⁵ Hence it is essential to understand the awareness levels in the community to plan effective eye care programs to deal with the problem. A RE can simply be diagnosed, and treated with aid of optical corrective approaches and devices such as spectacles, contact lenses or refractive surgical procedures.⁶ Despite this, an estimated 670 million people worldwide do not have spectacles or have inadequate correction. Current data suggests that more than 90% of people with uncorrected RE, worldwide,

reside in rural and low income countries⁷. In the past a series of studies using a survey methodology referred to as refractive error study in children (RESC), were performed in populations with different ethnic origins and cultural settings: a rural district in Eastern Nepal; a semi-rural country outside of Beijing, China; an urban area of Santiago, Chile; an urban and semi-rural area of Kwazulu-Natal, South Africa; a rural district near Hyderabad India; and urban area of New Delhi India.⁸⁻¹¹ These studies have confirmed that the need for RE correction is higher for children. Result shown in the studies indicates that RE in children causes upto 77% of blindness and severe visual impairment (<6/60 in better eye) in India, 75% in China, and 62.5% in Chile. RE is the cause of visual impairment (<6/12 in the better eye) in 83% of children in urban India, 70% in rural India, 93% in China, 55.1% in Nepal, 55% in Chile, and 63.6% in South Africa.⁸⁻¹¹ Of these cases 86% of children in rural India presented without correction for RE, 92% in Nepal, 58% in China, 46% in Chile, and 71% in South Africa. Lack of awareness of RE's was one of the barriers for uncorrected refractive errors and presbyopia lack of awareness and recognition of RE's as correctable cause of vision impairment was one the important barriers for correction of RE.^{12,13}

METHODS

The detailed methodology followed was published earlier Pallerla et al.¹⁴ The study was approved by the ethics committee of LV Prasad eye institute as part of KAP on eye health and diseases among general public in the South Indian states of Andhra Pradesh and Telangana and was conducted in accordance with the principles of Declaration of Helsinki. Briefly the survey was based on stratified multistage, cluster sampling strategy. This was a cross sectional study of people from one urban and three rural areas of the both the states of Andhra Pradesh and Telangana with the aim of having study sample representation of urban and rural districts of both the states of Andhra Pradesh and Telangana.

The study was conducted on adult population of ≥ 16 years of age. A structured questionnaire was designed in order to get information related to awareness and knowledge of refractive error and strabismus. The Questionnaire had two sections. The first section contained questions on Awareness of eye diseases including refractive errors and strabismus. The second section had questions on the demographic profile of the subjects. The subjects were given the questionnaire to fill in and if the subject was illiterate, he or she was asked to

respond to the questions narrated by the investigator in the local language. Having heard of refractive error and strabismus (squint) was taken as 'awareness' and having understanding of its effect on vision as 'knowledge'.

A pilot study was conducted before the main study. The Cronbach's Alpha for the questions on awareness, knowledge refractive error and strabismus was 0.14 (95% CI; 0.0, 0.40). With the experience garnered in pilot study, questions were modified so that they were easily understood in the local language without losing the meaning. The data were entered in excel and statistical package SPSS version 19.0 was used for data analysis. The multiple logistic regression was used to ascertain the association between awareness and knowledge to individual characteristics-age, gender, education level, urban and rural, and occupation. All p values are reported and significance level was $p < 0.05$.

RESULTS

A total of 782/867 (90.1%) subjects participated in the survey with females 47.4% (Table 1). Out of 782 subjects participated 581 (74.3%) were aware of refractive error. Among 581 subjects 277 (47.6%) were females (Table 2). Among the 581 who were aware of RE 267 (45.9%) were wearing glasses, 201 who were not aware of RE 54 (26.8%) were wearing glasses (Table 5). With multiple logistic regression about awareness of refractive error to various variables, subjects who were educated 11th class to degree had higher awareness (OR: 2.40; CI: 1.25-4.60) (Table 3).

Out of 782 subjects participated 696 (89.0%) were aware of strabismus. Out of 696 subjects 341 (48.9%) were females (Table 2). Among 696 subjects who were aware of strabismus, 294 (42.2%) were wearing glasses. 86 subjects who were not aware of strabismus, 29 (33.7%) were wearing glasses (Table 5). With multiple logistic regression about awareness of squint to various variables females had a higher awareness of squint (OR: 1.98; CI: 1.19-3.31) (Table 4).

Of the 777 subjects responded to the question whether they wearing glasses or not, 325 (41.8%) were wearing glasses, out of which 133 were wearing for distance, 82 for, near, 98 for both distance and near vision and 12 subjects reported they didn't know what for they were wearing glasses. Among the spectacle wearers highest percentage of age group was seen in ≥ 70 years of age (68.2%) followed by 40-69 age group (42.8%) and 16-39 age group (38.7%).

Table 1: Demographic profile of study participants, (n=782).*

Variables	Agriculture	Business	Student	Employee	Labourer	Housewife	Others	Total
Age group (Years)								
16-39	80	15	103	60	124	24	1	407
40-59	72	4	0	51	98	24	0	249
≥ 60	48	1	1	7	60	5	2	124

Continued.

Variables	Agriculture	Business	Student	Employee	Labourer	Housewife	Others	Total
Gender								
Male	107	19	70	91	120	0	3	410
Female	93	1	34	27	162	53	0	370
Education								
Illiterate	80	0	0	5	124	10	0	219
1-10 th class	117	4	6	19	140	31	1	318
≥11 th class	3	16	98	94	18	12	2	243
Location								
Urban	2	19	70	82	5	37	2	217
Rural	198	1	34	36	277	16	1	563

*Data from two participants missing

Table 2: Awareness of the refractive error and squint, (n=768).

Variables	Total responses	Awareness of refractive error/squint (%)	
Age group (Years)			
16-29	219	180 (82.2)	202 (92.7)
30-39	180	134 (74.4)	167 (89.8)
40-49	139	103 (74.1)	122 (87.8)
50-59	105	80 (76.2)	97 (91.5)
60-69	83	58 (69.9)	72 (87.8)
≥ 70	42	26 (61.9)	36 (83.7)
Gender			
Male	405	304 (75.1)	355 (87.4)
Female	363	277 (76.3)	341 (92.7)
Education			
Illiterate	212	149 (70.3)	195 (90.3)
1 st to 5 th	104	77 (74.0)	92 (86.8)
6 th to 10 th	209	143 (68.4)	186 (88.6)
11 th to degree	216	187 (86.6)	197 (92.1)
Masters and above	25	23 (92.0)	24 (92.3)
Area			
Urban	216	182 (84.3)	195 (90.3)
Rural	552	399 (72.3)	501 (89.8)

*number of subjects responded for awareness of refractive error and squint

Table 3: Multiple logistic regression showing association between awareness of refractive error and various variables, (n=782*).

Variables	Total responses for refractive error	No. of aware of refractive error (% in parenthesis)	Odds ratio for being aware of refractive error multiple logistic regression; 95% CI	P value
Age group (years)				
16-29	219	180 (82.2)	1.00/1.00	
30-39	180	134 (74.4)	0.86; 0.51-1.45	0.59
40-49	139	103 (74.1)	0.87; 0.50-1.51	0.62
50-59	105	80 (76.6)	1.04; 0.56-1.94	0.88
60-69	83	58 (69.9)	0.77; 0.40-1.46	0.42
≥ 70	42	26 (61.9)	0.56; 0.26-1.22	0.14
Sex				
Men	405	304 (75.1)	1.00/1.00	
Women	363	277 (76.3)	1.31; 0.92-1.86	0.12
Education				
Illiterate	212	149 (70.3)	1.00/1.00	
1 st to 5 th class	104	77 (74.0)	1.18; 0.69-2.01	0.53
6 th to 10 th class	209	143 (68.4)	0.87; 0.56-1.34	0.54
11 th to degree	216	187 (86.6)	2.40; 1.25-4.60	0.008
≥Masters	25	23 (92.0)	4.21; 0.91-19.41	0.06

Continued.

Variables	Total responses for refractive error	No. of aware of refractive error (% in parenthesis)	Odds ratio for being aware of refractive error multiple logistic regression; 95% CI	P value
Area				
Urban	216	182 (84.3)	1.00/1.00	
Rural	552	399 (72.3)	1.18; 0.70-2.00	0.52

(Hosmar Lemeshow goodness of fit test=0.94), *14 subjects non respondents.

Table 4: Multiple logistic regression showing association between awareness of squint and various variables, (n=782*).

Variables	Total responses for squint	No. of aware of squint (percentage in parenthesis) (%)	Odds ratio for being aware of squint multiple logistic regression; 95% CI	P value
Age group (years)				
16-29	218	202 (92.7)	1.00/1.00	
30-39	186	167 (89.8)	0.77; 0.36-1.62	0.49
40-49	139	122 (87.8)	0.66; 0.30-1.42	0.28
50-59	106	97 (91.5)	1.06; 0.42-2.68	0.89
60-69	82	72 (87.8)	0.63; 0.25-1.58	0.32
≥70	43	36 (83.7)	0.52; 0.18-1.45	0.21
Sex				
Men	406	355 (87.4)	1.00/1.00	
Women	368	341 (92.7)	1.98; 1.19-3.31	0.008
Education				
Illiterate	216	195 (90.3)	1.00 / 1.00	
1 st to 5 th class	106	92 (86.8)	0.66; 0.32-1.38	0.28
6 th to 10 th class	210	186 (88.6)	0.83; 0.44-1.59	0.59
11 th to degree	214	197 (62.1)	1.54; 0.61-3.83	0.35
≥ masters	26	24 (92.3)	1.60; 0.31-8.12	0.57
Area				
Urban	216	195 (90.3)	1.00/ 1.00	
Rural	558	501 (89.8)	0.75; 0.37-1.54	0.44

Hosmar Lemeshow goodness of fit test=0.60, * Totals may not add to as some subjects didn't respond.

Table 5: Association of awareness of refractive error and squint to wearing of glasses and eye examination, (n=782).

Variables	Awareness of refractive error		Awareness of squint	
	Yes (n=581*)	No	Yes (n=696*)	No
Wearing of glasses				
Yes	267	54	294	29
No	312	132	401	48
Eye examination in the last 2 years				
Yes	270	64	305	31
No	287	111	357	46

* The total does not add as some subject did not respond.

DISCUSSION

This study examined the awareness and knowledge of adults in urban and rural areas. The study was undertaken as part of KAP study to identify information that could help in formulating strategies to increase the awareness levels of refractive error, strabismus and amblyopia. The results of this study show that the majority of participants were aware of refractive error and strabismus.

In this study it was found that younger people and females were more aware of the refractive errors and

strabismus. People with higher education had a higher awareness of both refractive errors and strabismus. There was no difference in the awareness levels of location of the participants either urban and rural.

The awareness levels (74.3%) of RE in the present study is comparable to the study done by Chew et al (75.3%), and Aldebasi.^{1,15} There should be emphasis on public education on awareness and significance of early detection of refractive errors. The awareness levels of strabismus is high in the present study. Females had a higher awareness of strabismus in the present study

similar to the other studies done elsewhere.¹⁶ In a study done by Hegde et al the awareness of squint was 90% among the patients attending the eye camps in rural India.¹⁷ This will help in early detection and treatment of RE, strabismus and amblyopia thereby reducing the prevalence of strabismus and amblyopia in children and consequently improve the educational opportunities and their quality of life. There are limitations to this study that need to be considered when interpreting the results. Self-reporting of the data can be influenced by recall bias. For those participants who were illiterate the interpreter marked the responses. This may also can influence the information. Notwithstanding these limitations the results indicate that the study population had a high level of awareness of refractive errors and strabismus, but their knowledge was still limited.

One of the pre-requisites of health seeking behavior is knowledge of disease and their symptoms which seems to be lacking in parents of children.¹⁸ Hence the programs to increase awareness of causative factors, spectacle wearing and the harmful effects of squint should be conducted. The lack of knowledge and awareness of refractive errors are important risk factors for under corrected refractive error in an urban Singapore population.¹⁹ A study done by Ranjbar et al studied at major deficiencies in the public awareness about the role of ophthalmologists as well as refractive error correction methods in Iran.²⁰

CONCLUSION

Awareness of squint and refractive error was high among the general public, but the knowledge of it was limited.

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Conflict of interest: None declared

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REFERENCES

- Chew YK, Reddy SC, Karina R. Awareness and knowledge of common eye diseases among the academic staff (non-medical faculties) of University of Malaya. *Med J Malaysia*. 2004;59:305-11.
- Thulasiraj RD, Aravind S, Pradhan K. Spectacles for the Millions Addressing a priority of "VISION 2020 -The Right to Sight". *Community Ophthalmol*. 2003;3:19-21.
- Bourne RR, Dineen BP, Huq DM, Ali SM, Johnson GJ. Correction of refractive error in the adult population of Bangladesh: meeting the unmet need. *Invest Ophthalmol Vis Sci*. 2004;45:410-17.
- Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bull World Health Organ*. 2008;86:63-70.
- Shrestha GS, Digen Sujakhu, Joshi P. Refractive error among school children in Jhapa, Nepal. *J Optom*. 2011;4:49-55.
- Kempen JH, Mitchell P, Lee KE, Tielsch JM, Broman AT. The prevalence of refractive errors among adults in the United States, Western Europe, and Australia. *Arch Ophthalmol*. 2004;122:495-505.
- World Health Organization. Director-General's Office. Communications Office. Sight test and glasses could dramatically improve the lives of 150 million people with poor vision. Geneva: World Health Organization. 2006;2.
- Zhao J, Pan X, Sui R, Munoz SR, Sperduto RD. Refractive Error Study in Children: results from Shunyi District, China. *Am J Ophthalmol*. 2000;129:427-35.
- Naidoo KS, Raghunandan A, Mashige KP, Govender P, Holden BA. Refractive error and visual impairment in African children in South Africa. *Invest Ophthalmol Vis Sci*. 2003;44:3764-70.
- Dandona R, Dandona L, Srinivas M, Sahare P, Narsaiah S. Refractive error in children in a rural population in India. *Invest Ophthalmol Vis Sci*. 2002;43:615-22.
- Murthy GV, Gupta SK, Ellwein LB, Munoz SR, Pokharel GP. Refractive error in children in an urban population in New Delhi. *Invest Ophthalmol Vis Sci*. 2002;43:623-31.
- Marmamula S, Khanna RC, Shekhar K, Rao GN. A population-based cross-sectional study of barriers to uptake of eye care services in South India: the Rapid Assessment of Visual Impairment (RAVI) project. *BMJ Open*. 2014;4:e005125.
- Yasmin S, Minto H. Community Perceptions of refractive errors in Pakistan. *Comm Eye Health*. 2007;20:52-3.
- Pallerla SR, Khanna RC, Sannapaneni K, Keeffe J. Public knowledge, attitudes and practices related to eye diseases in Southern Indian population. *Int J Community Med Public Health*. 2020;7:4993.
- Aldebasi Y. Young Public's Awareness to Refractive Error Deficiency. *Int J Health Sci (Qassim)*. 2011;5:9-15.
- Isawumi MA, Ulaikere M, Adejumo OO, Adebayo M, Kekunnaya R. Awareness, perceptions and knowledge of strabismus among patients visiting a tertiary eye clinic in Southwest Nigeria. *Int Ophthalmol*. 2014;34:1037-42.
- Hegde S, Mendonce N, Kamath BS, Vinay PG. Assessment of awareness and psychosocial impact of strabismus in rural India. *IJBR*. 2014;05:744-7.

18. Senthilkumar D, Balasubramaniam SM, Kumaran SE, Ramani KK. Parents' awareness and perception of children's eye diseases in Chennai, India. *Optom Vis Sci.* 2013;90:1462-6.
19. Rosman M, Wong TY, Wong W, Wong ML, Saw SM. Knowledge and beliefs associated with refractive errors and undercorrection: the Singapore Malay Eye Study. *Br J Ophthalmol.* 2009;93:4-10.
20. Ranjbar AKSM, Pourmazar R, Gohary I. Awareness and Attitude toward Refractive Error Correction

Methods: A Population Based Study in Mashhad. *Patient Saf Qual Impro.* 2013;1:23-9.

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