



Profile of refractive error among children attending ophthalmology OPD at a tertiary care hospital in Kolar

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Abstract

Introduction: Refractive error is one of the most common cause of visual impairment among children. This poses a threat to not only the educational aspect and personal development of the child but also cause a burden on the socioeconomic status of the society. Uncorrected refractive error can result in amblyopia which causes permanent deterioration of vision, therefore early detection and timely intervention is important.

Materials and Methods: A prospective observational study was conducted on all the children less than 17 years who visited the Ophthalmology OPD, for a period of 3months, at a tertiary health care centre in Kolar.

Results: Our study showed that most of the study subjects, 60.50%, were normal. Myopia was the most common refractive error diagnosed in them (26.30%), followed by Hypermetropia (7.90%) and mixed astigmatism (5.30%).

Conclusion: This study shows us a small part of a large picture of the prevalence of blindness due to refractive error, which is a worldwide problem. Thus, this study throws light on the type of refractive error in this region and helps in better planning of healthcare strategies.

Keywords: ophthalmology, uncorrected, deterioration, Hypermetropia

1. Introduction

Eyes play an important role in the development of the visual cortex by continuous visual stimulation of the brain from childhood [1]. A person is said to have a refractive error if the parallel rays of light do not focus on the retina, when the accommodation of the eye is at rest [2]. It can be myopia, hypermetropia, astigmatism or presbyopia [3]. Refractive error is one of the most common cause of visual impairment among children [4]. This poses a threat to not only the educational aspect and personal development of the child but also cause a burden on the socioeconomic status of the society [5]. Uncorrected refractive error can result in amblyopia which causes permanent deterioration of vision [6].

Studies have shown that about 1.4 million children in the world are blind and about two third of them are from India. In India about 6-7% of children within the age of 10-15 and about 20% of children by the age of 16years develop refractive error [7]. One of the most common cause for ophthalmic consultation is refractive error and it forms the second most common cause of preventable blindness [8].

Refractive errors can go unnoticed in children and therefore timely screening and treatment becomes important⁵. School screening programs which are conducted all over the country play an important role in gathering data which is essential in formulating accessible health plans. Studies have shown that despite the ongoing school screening programs, there are a high number of children with undetected amblyopia⁵. It poses a substantial problem in both the developed and developing countries [8]. Thus, Vision 2020 has included refractive error in the group of Childhood Blindness and

Has been striving for its elimination [9]. All these details will help us formulate health plans to eliminate avoidable cause of Visual loss among children who are the future of the society [5].

Materials and Methods

A prospective observational study was conducted on all the children less than 17 years, for a period of 3months, who came to the Ophthalmology OPD at a tertiary health care centre in Kolar. The IEC was taken prior to the start of study. Patient aged more than 18 years, those with cataract, conjunctivitis, uveitis, scleritis, retinitis pigmentosa and other fundal pathologies were excluded from the study.

A total of 38 children were chosen to study the distribution of refractive error among children attending OPD. First their vision was assessed, slit lamp examination was performed, refraction was done, and the type of refractive error was assessed in detail. In suitable patient's cycloplegic refraction was done depending upon their age of presentation. Standard protocol for cycloplegic refraction was followed depending upon their age group. For those who were less than 7years of age, Atropine 1%, 3 times per day for 3 days was administered and cycloplegic refraction was done after three days, for those between 7-12 years, homatropine 1% was used and cycloplegic refraction was done after 1 hour and for children more than 12 years, cyclopentolate was used and cycloplegic refraction was done after 45 minutes. A dilated fundoscopic examination was done to rule out fundal pathologies.

Results

A total of 38 patients were examined.

Table 1: Gender Distribution of Subjects

Male	21
Female	17

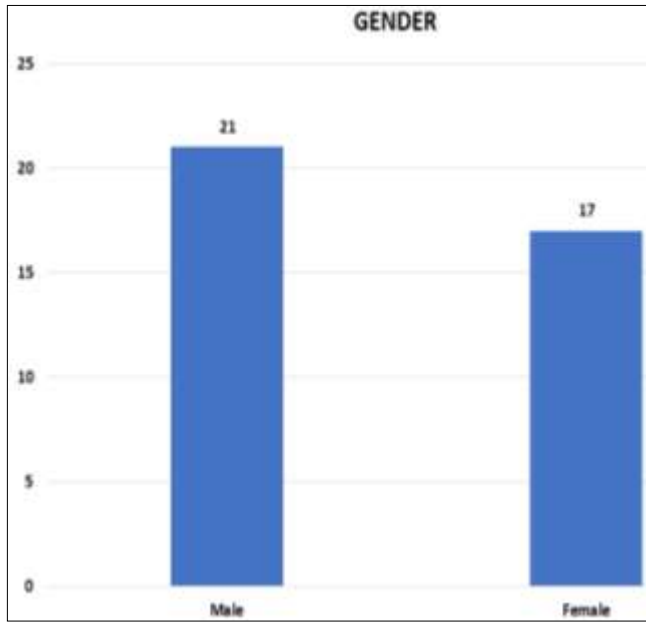


Fig 1: Gender Distribution of Subjects 55.26% of the subjects were male and the rest female.

Table 2: Age Distribution of Subjects

<7 years	1
7-12 years	16
>12 years	21

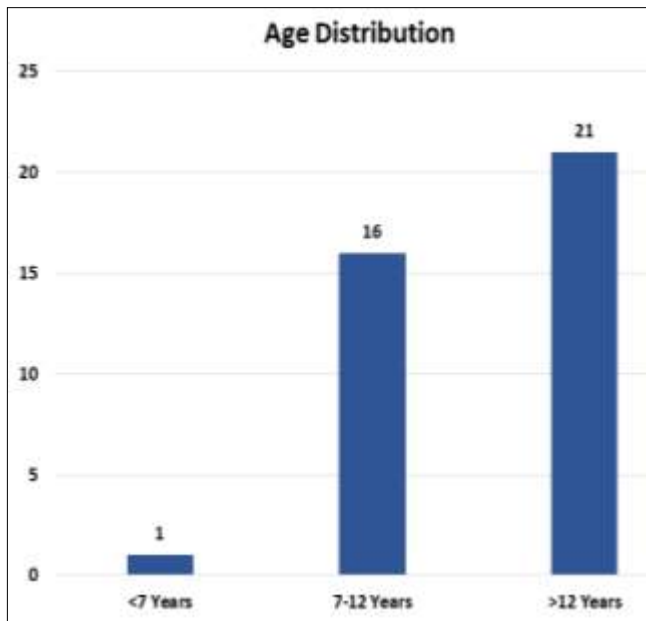


Fig 2: Age Distribution of Subjects 21 subjects were above 12 years, 16 were between 7 to 12 years and 1 subject was less than 7 years.

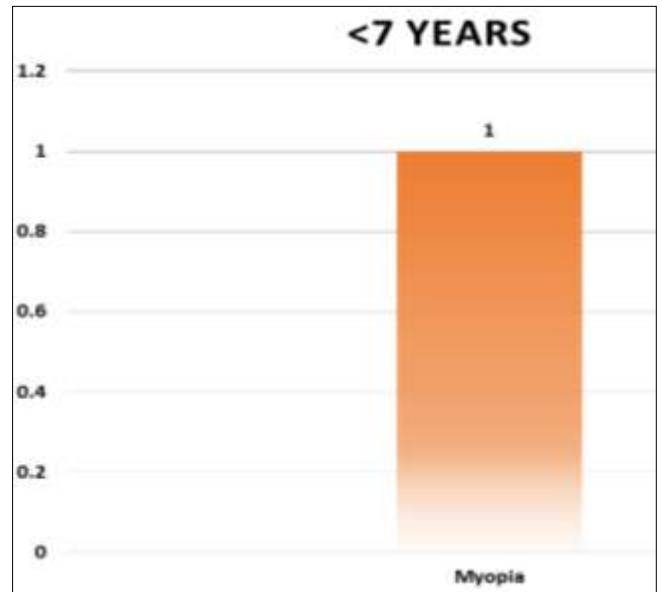


Fig 3: Age Wise Distribution of Refractive Error- <7 Years

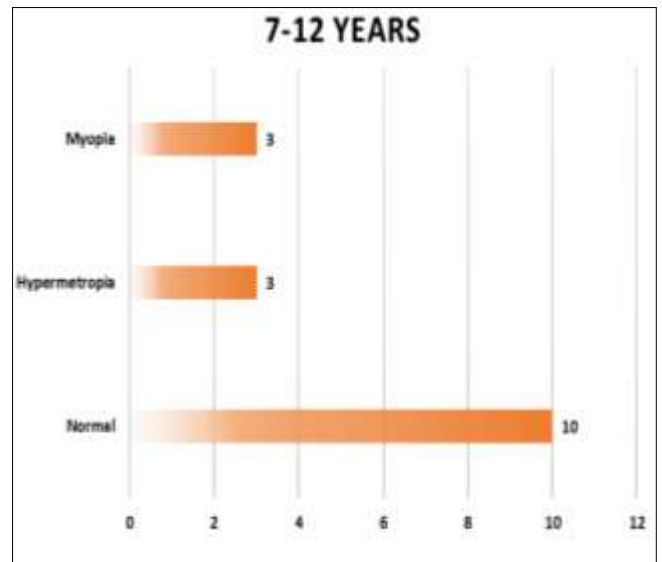


Fig 4: Age Wise Distribution of Refractive Error- 7-12

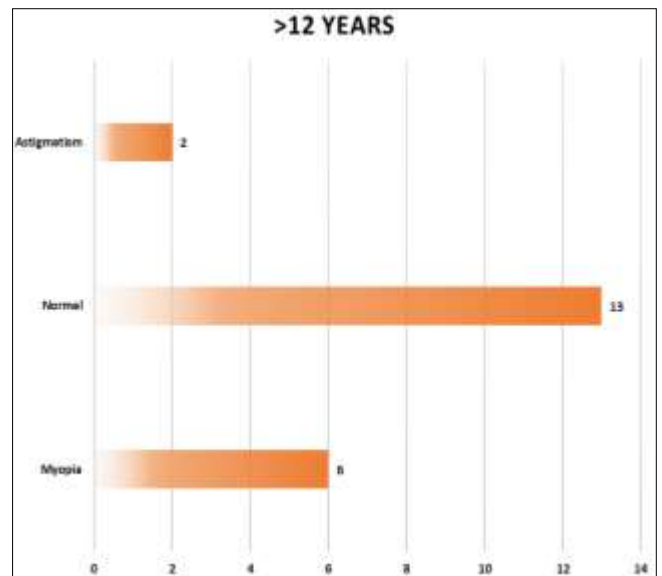


Fig 4: Age Wise Distribution of Refractive Error- >12 years

This study showed that one child was less than 7 year of age and had myopia. 16 children were between 7-12 years of age with 10 being normal, 3 hypermetropia and 3 myopia. 21 children belonged to the age group of more than 12 years of which 13 were normal, 6 had myopia and 2 had astigmatism.

Table 3: Refractive Error Distribution

	Myopia	Hypermetropia	Mixed Astigmatism	Normal
Male	6	1	1	13
Female	4	2	1	10
Total	10	3	2	23
Percentage	26.30%	7.90%	5.30%	60.50%

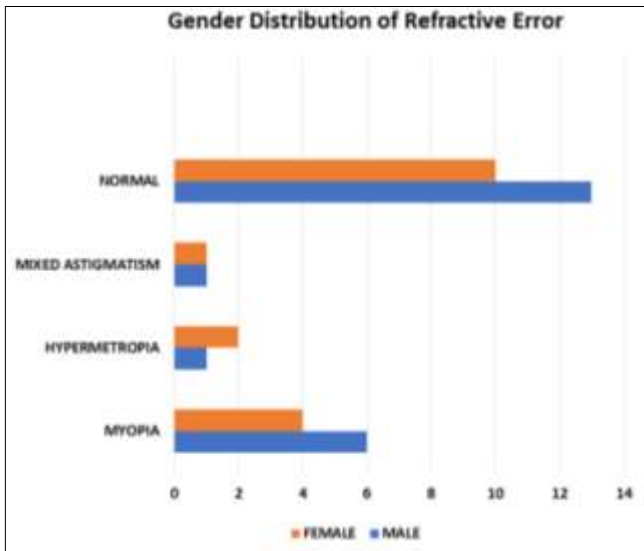


Fig 4: Gender wise Refractive Error Distribution

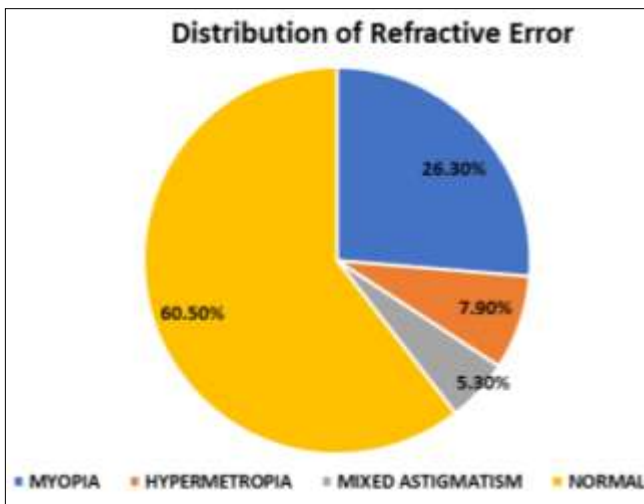


Fig 5: Percentage-wise Refractive Error Distribution

Our study showed that most of the study subjects, 60.50%, were normal. Myopia was the most common refractive error diagnosed in them (26.30%), followed by Hypermetropia (7.90%) and mixed astigmatism (5.30%).

Table 4: Gender wise distribution of refractive error

	Male	Female
Astigmatism	1	1
Hypermetropia	1	2
Myopia	6	4
Normal	12	11

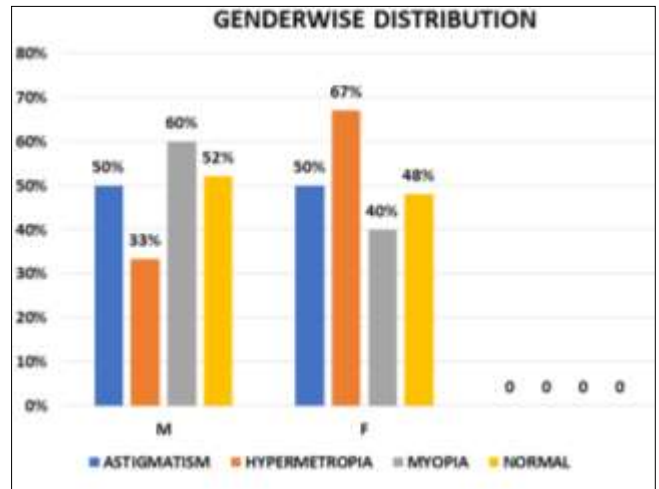


Fig 6: Gender Wise Percentage Distribution of Refractive Error

Male	Female	
50%	50%	Astigmatism
33%	67%	Hypermetropia
60%	40%	Myopia
52%	48%	Normal

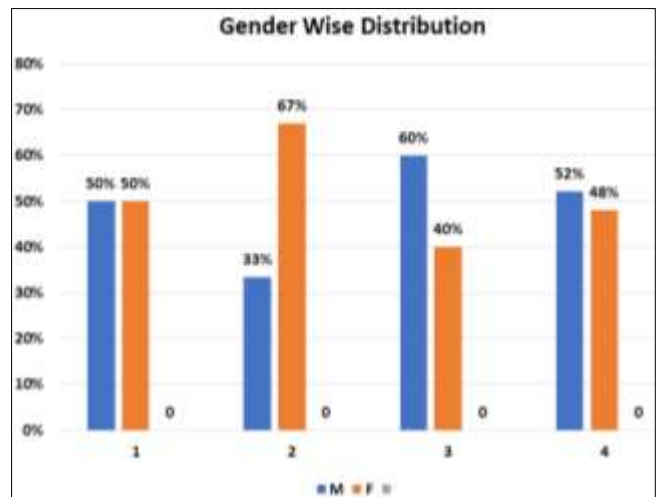


Fig 7: Gender Wise Percentage Distribution of Refractive Error

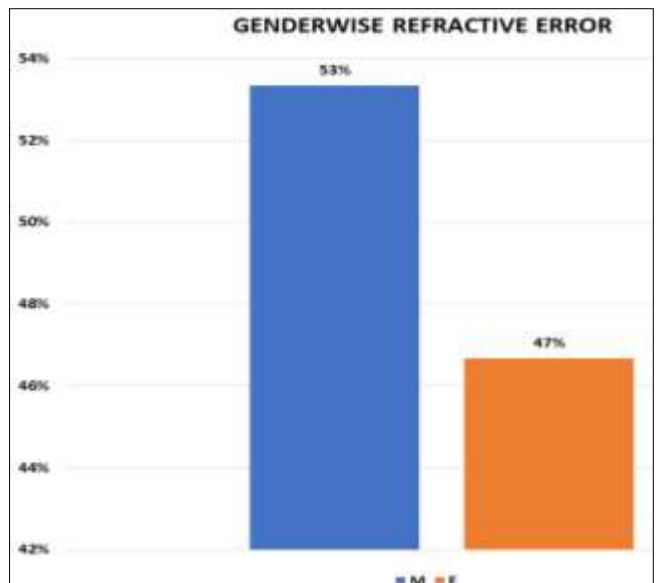


Fig 8: Gender Wise Percentage Distribution of Refractive Error

Discussion

Onset of blindness in young children is a concerning factor as they must survive many years with their visual disability [5].

Studies have shown that just prescription of spectacles is not enough but repeated follow up and replacement of the damaged spectacles is an important factor for the successful outcome treatment of refractive error [10].

Majority of our subjects with refractive error belonged to the age group of more than 12 years. Studies have shown that there is an increase prevalence of poor vision among the 10-15 age group [5]. This might be due to the increase incidence of refractive error in pubertal age group [11] or due to the higher incidence of health care seeking behaviour in them as they have more asthenopia symptoms in them due to increase in near work/ academic activities in that age group [5].

53% of the male children had refractive error in our study. Other studies show that there is a higher incidence of refractive error in female students which might be attributed to the early attainment of puberty among them when compared to the boys [12, 13]. Studies also show a difference in the gender distribution of refractive error when conducted in hospitals and in general population. Similar results were seen in other hospital-based studies conducted in North India, Nepal, New Delhi and Pakistan. On the contrary, population based studies conducted in Bangalore, Jaipur and Tamil Nadu showed a female preponderance [14]. The cause for this variation between hospital and population based study is not known.

This study showed that majority of the patients had myopia (26.3%) followed by hypermetropia (7.9%) and astigmatism (5.30%). Many studies conducted throughout the world and in the country show myopia to be the most common cause of refractive error [12, 15]. Myopia > hm > astig [16]. Children from urban areas show a higher incidence of myopia in them [16]. These findings are similar to other studies and may be attributed to the higher academic related activities, near work [17] and use of electronic devices in the urban children when compared to the rural [16].

But most of the studies showed that Astigmatism was more common than myopia which was more common than hypermetropia [1, 5, 14]. Similar results are seen in studies conducted in Nepal, Ethiopia and Egypt [14].

Studies conducted in South India by Kalikivayi V [18]. *et al* and in Macedonia by Mamudi E [19]. *et al* showed that hypermetropia was the most frequent refractive error encountered. One reason for this might be a difference in the age group in the study population [14]. School going children and teenagers are more likely to be diagnosed with myopia when they present with difficulty in viewing the board in class whereas children with hypermetropia may not complain of this due to accommodation [14]. If small children are included in the study, it is more likely to have larger number of hypermetropies, which might be physiological. Studies conducted by Murthy *et al*, and various national and international studies showed a age wise shift from hypermetropia in the younger to myopia in the older children [14, 20, 21]. myopia was higher in girls than in boys. This might be due to the increase in academic, indoor and near work related hobbies in girls when compared to the boys who usually prefer outdoor sport activities [17]. A study done by Hendrick's *et al*. showed that headache was the commonest symptom of presentation among school going

children and was more common in girls than boys and more common in school going than those who didn't [22].

A study conducted in Singapore showed that most of the children with myopia were found in the school going age group and was proportionate to higher educational status [23].

Population based surveys have shown that refractive errors are more common in urban areas when compared to rural. This might be due to the decrease health care access to children in rural areas as expressed by studies done by Dandona *et al* [12]. and Murthy *et al* [24]. Similar studies done in Pune [25] and Madhya Pradesh [26]. showed that this might be due to poor spectacle compliance among rural children. Studies in China, Tanzania and Mexico showed that there are many children who need spectacles but do not have the access to it [5].

These data alert the health care policy makers to focus on the accessibility of the spectacles to rural children and to strengthen the school screening activities in rural areas [5].

Studies have also shown a higher risk of refractive error was associated with the higher level of education of the patient [14]. This may be due to the children being more exposed to academic work/ near work which can result in early detection [14].

Conclusion

The prevalence of refractive error is high, studies have shown that permanent damage can be avoided if timely intervention is given in the form of spectacle correction or occlusion therapy when indicated [1]. Teachers and parents must also look at repeated eye rubbing or blinking or inability to concentrate in class as a need for ophthalmic examination. They must be instructed to look at other causes of refractive error like strabismus, corneal opacity, etc [1].

Refractive error and amblyopia in children pose a threat to the public health as children are the future of the economy of our country [1]. Therefore, vigorous school screening programs followed by spectacle prescription and compliance check, will help decrease the number of children who go into permanent irreversible blindness.

This study shows us a small part of a large picture of the prevalence of blindness due to refractive error, which is a worldwide problem. Thus, this study throws light on the type of refractive error in this region and helps in better planning of healthcare strategies.

The success of any public health program depends on adequate follow up of defaulters with the commitment of health care workers [5].

Limitations: the sample size was a major limiting factor in this study, because of which the data cannot be extrapolated to the general population.

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