

## **Young Public's Awareness to Refractive Error Deficiency**

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### **Abstract:**

**Background:** Visual impairment due to uncorrected refractive error affects 200 - 250 million people in the world. Uncorrected vision represents the 2<sup>nd</sup> or the 3<sup>rd</sup> blinding condition in many developing countries. The importance of awareness in dealing with this problem has been shown to reduce the risks of blindness and improve the quality of vision.

**Methods:** Survey questionnaires have been distributed to 2500 randomly selected people from 6 different locations in Riyadh area between late 2003 and early 2004. Only 2039 data sheets (58% female and 42% male) have been analyzed; the remaining 461 data sheets were cancelled whether for biased responses or for ages those were outside the limited range (15-45 years). The questionnaire was designed to show responses according to three levels of education: basic, intermediate and high.

**Results:** 8% of the sample individuals wear spectacle. Of these, 2/3 acknowledges the importance of wearing spectacles. For those who don't, intellect is a determining factor in how people consider optical correction (21% of basic intellectual backgrounds only think it is important to wear glasses against some 40% of higher intellect). Most of the other results showed the effect of education in increasing the level of awareness in vision related questions. People with higher education are more aware than those with basic intellect in acknowledging: visual symptoms that need care (37% against only 26%), presbyopia condition (23% against 11%), urgency to seek eye care (85% against 29%), factors aggravating refractive errors in children (45% against 29%). Knowledge about the different forms of optical correction showed higher preference for spectacles against both contact lenses and refractive surgery.

**Conclusion:** There is an overall tendency to show that the general public is not aware about most of the problems that concern their visual health. This is even more so in those with basic intellectual levels. In order to reduce the impact of visual problems related to ignorance in society, certain steps directed towards the general public should be undertaken, such as information through media and publicity, public education, screenings for ametropia in schools and at work, government subsidies of optical equipments etc.

**Keywords:** Refractive error, awareness, public, education, visual impairment.

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## Introduction

The World Health organization (WHO), in its most latest global statistics has revealed that, there are 37 million blind people, including 1.4 million children under the age of 15, and 125 million with severely impaired vision, resulting in a total of over 160 million visually impaired people. <sup>(1)</sup> In addition, visual impairment due to uncorrected refractive error has been estimated to affect 200 - 250 million people.

The high prevalence of refractive errors in children and young adults has long been documented. In some countries like Southern China, myopia (spherical equivalent of at least -0.50 D in either eye as measured with retinoscopy) affected some around 75% of children at 15 years of age. <sup>(2)</sup> It is known that, hyperopia (spherical equivalent of +2.00 and higher) is the main refractive deficiency in children of low age (4-6 years) where 15 and 20% are known to be hyperopic in Australia <sup>(3)</sup> and South China <sup>(2)</sup> for example. However, as age increases, myopia becomes more frequent especially in adolescents and young adults. In all, refractive error prevalence in the world is high and is especially high in populations of Chinese origin.

Apart from refractive errors, there are number of other causes that can cause symptoms in children related to refractive eye conditions, namely astigmatism, phoria, accommodative dysfunctions (e.g. lag of accommodation), and extra-ocular muscular imbalance (e.g. strabismus). Most of these conditions can cause a reduction in the visual performance of the child in some way and can unfortunately lead to unpleasant ocular symptoms. The most commonly known symptoms among a child or adolescent are repeatedly complain of include eyestrain, headaches, blurred vision, intermittent double vision, etc. The consequence would necessarily lead to some sort of fatigue, and if untreated, the problem would have a lasting

effect on the child's performance at school. Refractive spectacle users, who did not comply, were most likely prepared to report eyestrain and headache or to have had learning difficulty at school. <sup>(4)</sup>

In Saudi Arabia, a previous study conducted in Al Bisha region <sup>(5)</sup> shows no less than 11% of visual impairment cases, of which 68% were of refractive origin. This is high in many ways, and the need to do something about it is urgent, especially when these conditions are preventable to a large extent. Awareness about refractive error and other eye problems and their treatment can play an important role in the prevention of blindness from common eye disorders. An informed public is also more likely to be sensitive to focused prevention programs and to comply with recommended treatment plans.

## Materials and methods

The present study is conducted in a large cross-sectional sample of young-adult general population between September 2003 and April 2004 in Riyadh Saudi Arabia. A wide yet focused range of questions were presented in the form of a survey and distributed to 2500 randomly selected people from people attending six commercial malls (three in the north, one in the center and two in the east) of Riyadh Metropolitan City. The number of returned but fully and comprehensively completed questionnaires was 2216. The population ages ranged from 15 to 61, but subjects older than 45 (8%) were disregarded to avoid biased interpretation associated with education since most above 45s did not take advantage of the education system implemented in the kingdom since the 1960s. The remaining 2039 (table 1) data sheets were divided into two groups, young between 15 and 29 years (71%) and young adults between 30 and 45 years (29%). Of the total participants, 856 (42%) were male and 1183 (58%) were female.

**Table 1.** Sample data for the 2039 subjects and their ratios for age, sex, educational level, social status and correction.

	Number	Percent
<b>Age</b>		
15-29	1372	71%
30-45	667	29%
<b>Sex</b>		
Male	856	42%
Female	1183	58%
<b>Educational level</b>		
Basic	337	16.5%
Medium	767	37.6%
High	935	45.9%
<b>Social status</b>		
Basic	964	47.3%
Middle	557	27.3%
Well off	518	25.4%
<b>Wears glasses, CL (no reading)</b>		
Yes	165	8.1%
No	1874	91.9%

Data relative to social and intellectual backgrounds were collected. Corrected relative social status, which takes account of monthly income, family size and area of living was divided into basic, middle and well of. However, these data could not be analyzed at the present time and would be used for another study. Indeed, three levels (basic, intermediate and high) of intellectual ranking were defined, which correspond respectively to primary education, intermediate to high school education and university education and above. Participants were asked to answer all questions in the survey. Clear instructions were given to avoid misleading and confusion, and the optional answers were presented in the form of multiple choices written in a very easy and common language.

The questionnaire was made of the following:

1. Personal information (age, sex, level of education, social status of the person or family, spectacles wear if any).
2. Questions related to the study, which includes awareness to the following:

- Refractive error symptoms such as blurred vision for near or far distances, headaches when reading, etc...
- The existence of different types of refractive errors
- Importance to wear correction glasses if prescribed
- Some knowledge of what might aggravate refractive errors (reading, TV watching, video games, bad illumination, etc...).
- Knowledge about presbyopia
- Preference of a correction mode (spectacles, contact lenses, refractive surgery).
- Knowledge about contact lenses
- Knowledge about refractive surgery
- Awareness of parents to the importance of optical correction wearing for their children if they would have to.

A study relating awareness to financial situation and family income will be carried out separately later. The level of income of the child's family may be a key factor in both the parents and child's awareness in its present form, this study addresses the question of awareness in relation to the education. The role of parents is important for very small children who may or may not be able to describe visual symptoms that affect their deficient vision.

### Results

The results of the survey show the importance of education in having knowledge

or awareness about common health problems (table 2). Of the 2039 who participated in the survey, intellect was a determining factor in knowing the most common symptoms related to refractive error problems. Twenty six percent only of those with basic education were found to have an idea about blurred vision, eyestrain or headaches that they are due to refractive error as such, compared to about 35% for intermediate and 39% for those with high education. There is obviously a distinctive part played by education, but this remains however unsatisfactory.

**Table 2:** Summary of questionnaire results relating the different types of awareness to degree of intellect.

Survey question (% Yes)	Basic Intellect	Medium Intellect	High Intellect
Awareness about symptoms	26	35	39
Awareness about refractive error	81	88	89
Presbyopia knowledge	11	22	24
Importance of wearing spectacles			
Spectacle wearers	64	67	66
Non Spectacle wearers	21	43	39
Awareness about factors aggravating RE	29	46	44
Awareness of urgency to seek eye care help	29	80	89
Prefer spectacles as form of correction	68	74	77
Prefer contact lenses as a form of optical correction			
Spectacle wearers	5	11	12
Non spectacle wearers	2	6	6
Prefer refractive photorefractive surgery	7	17	22
Awareness of existence of refractive surgery	56	56	83

Regarding the two most common types of refractive errors (farsightedness, nearsightedness), nearly all groups scored nearly equally. Awareness was high (81% for people with low education and 88% and 89% for those with intermediate and high education respectively). These high scores testify that hyperopia and myopia are a general knowledge and represent a known and common eye problem. Presbyopia as a physiological symptom affecting the eye in the

mid forties was known by 11%, 22% and 24% of the surveyed, according to level of education from basic to high respectively. This may be due to the fact that the sample age is low (>70% are below 30). Young people would therefore not be aware of presbyopia as health problem that they would have to live with when they get a little older.

From those who wear optical correction spectacles (8.1%), about 2/3 (65%) said they knew the importance of wearing them as

advised by their doctor (continuously most of the time). There was no difference between the three groups, perhaps because if they were already wearing spectacles, they surely would know the importance of compliance. However, the responses of non spectacle wearers were different. Only about 41% of those with medium to high education said they knew the importance of wearing glasses if they had been asked to do so. The figure is much lower for participants with lower education, because only about 20% seem to know the importance of spectacle correction wear for the control of refractive errors.

Another question that seems to present a high degree of awareness in the general young population is what may aggravate refractive errors in children and adolescents (only answers from parents, that is 36.2% of the sample, have been taken into account. The responses came as follows: 29%, 46% and 44% respectively for basic, intermediate and high education). Parent's level of education seems to make a difference in awareness about their children health problems, but does not seem to be enough. It remains that at least 55% (all groups combined); do not seem sensitive to visual problems affecting their little ones. Such problems like complaining of headaches, rubbing eyes frequently, avoiding close work, hold reading material closer than normal, using finger to maintain place while reading, omitting or confusing small words while reading etc., were not acceptably identified. However, there is a clear tendency that educated parents do understand the need to seek the help of an optometrist when their children complain of an urgent visual matter. Only 29% seem to acknowledge the importance of getting optometrist's help, but no less than 80 to 90% show consciousness of those with higher education levels.

Of the different forms of refractive error correction available today, an average of 75% (that is  $\frac{3}{4}$  of the sample) said they preferred spectacle glasses because of their fashionable designs and because of the lower risks to the eye. A little less than 10% in average of those who wear spectacles and no more than 5% of the others would like to try contact lenses for visual correction. However, there is an increasing tendency of the young population to go for photorefractive surgery (7%, 17.5% and 22% respectively for basic, intermediate and

high education), which is in accordance with the projections made by Briggs and Nacer.<sup>(6)</sup> The popularity of surgery in the correction of ametropia is high. About 60 to 80% in average knew the existence of correction by laser surgery. The preference of contact lenses as a form of correction does not seem popular with all groups of the sample.

### Discussion

Nobody denies that immense efforts have been made in the last 30 years by the authorities of the Kingdom of Saudi Arabia towards improving its population general health, and even more efforts have been dedicated to the education of its people. As the standard of living increases, it is expected that people become more aware of the health concerns that they encounter in their daily lives. The more educated people are, the more interest and certainly more demands on health services are seen. The correlation between the degree of awareness to visual problems and the level of education has been confirmed by many studies throughout the world and by the results of the present study.

The present study shows a little more than 8% of the sample wearing glasses for visual correction. One of the hypotheses as to the reason of this small number (compared to most previous studies, see below) may be that people would be unaware of the importance of wearing glasses or could have the wrong impression that glasses do in fact make it worse for the eye vision. This is untrue of course and hence can appear to have affected some of the spectacle wearers too (which are probably no less than 1/3 of the should-be wearers). In most Asian countries, the ratio of refractive error defective people is much higher as will be illustrated below. The facts are that the prevalence of refractive errors in most Asian populations is high; and so the ignorance that these can have major public health consequences. Refractive error may be viewed as resulting from a combination of genetic and environmental factors.<sup>(7)</sup> Myopia for instance has reached epidemic proportions in many countries such as Japan, Hong Kong, Taiwan and Singapore.<sup>(8)</sup> It is therefore very important that people should be aware of the necessity to go for regular eye checks in order to limit the complications of myopia. He et al.<sup>(9)</sup> reported that of the 74% of the South Chinese

children with refractive errors had spectacles but 30% of that group however, were undercorrected by 2 lines or more in the better eye. Of the children for whom spectacles were never purchased, lack of parental awareness was identified as the problem in half of the cases.

In study of Dandona R<sup>(10)</sup> et al, surveying over 15 years' old people in India, who had refractive error of +/-3.00D or worse, revealed that only 34% were wearing their glasses at the time of the follow up. Around 44% of those not wearing their spectacles cited problems related to poor quality of refractive services. In Cairo Egypt, El Bayoumi et al.<sup>(11)</sup> have found that the overall refractive error ratio among schoolchildren was as high as 22% (uncorrected VA <6/12), and no less than 12.5% of the sample had low vision. The problem of compliance, which reflects to some degree a certain level of awareness, is illustrated in a number of examples below. In a study which investigated spectacle coverage in Bangladesh, the ratio of those who needed spectacle correction and were actually wearing one, was found to be only 25.2%. This ratio was even lower in a similar study in Timor-Leste,<sup>(12)</sup> where only 15.7% of those with refractive errors and 26.2% of the presbyopes had in fact a spectacle correction. Eyeglass utilization studies showed widely varied levels of compliance with only 13.4% wearing the glasses at follow-up in Mexico,<sup>(13)</sup> but 71.6% of schoolchildren with refractive error problems were wearing them in Oman.<sup>(14)</sup> Noncompliance for not wearing glasses can vary from some understandable reasons such as cost (as in poor countries) to some equivocal cultural or esthetic reasons as in Mexico.<sup>(13)</sup> The present questionnaire responses reveal low awareness to visual symptoms and even lower for presbyopia, especially for basic education groups. Although high proportions (>80%) of the questioned young adults, seemed to be aware of the different types of refractive errors, only 21% of non spectacle wearers, low education group seem to understand the importance of optical correction. Higher education groups are more aware of the problem; however the ratio remains limited with only 40%.

Not wearing glasses when they are needed can result in some unpleasant consequences. In Tanzania,<sup>(15)</sup> uncorrected presbyopia was

shown to have a significant impact on vision-related quality of life. In a study sample, the prevalence rate of presbyopia was 62% and the majority (94%) did not have spectacles.<sup>(15)</sup> Globe et al.<sup>(16)</sup> showed in a study in Los Angeles that the vision related quality of life was correlated with visual acuity. It is not known from the present investigation the ratio of those of need of a correction and don't have it. Since there is a high percentage of people not recognizing the value of vision treatment (60 to 80% depending on level of education), it is essential that more screening be done in order to identify non compliant subjects. Although correction of refractive error leading to impaired vision is safe, easy and effective, more than half of the children (55%) who could achieve normal/near normal vision in at least one eye were without the necessary correction.<sup>(15)</sup> This unmet need for refractive correction was found in all Refractive Error Study in Children: 45% in Guangzhou China,<sup>(9)</sup> 72% in New Delhi India,<sup>(17)</sup> 73% in Shunyi District China,<sup>(18)</sup> 76% in La Florida (Chile),<sup>(19)</sup> 83% in Durban South Africa,<sup>(20)</sup> 92% in rural India<sup>(10)</sup> and 93% in rural Nepal.<sup>(21)</sup>

Being aware of these symptoms will cut short the suffering and distress the child can go through. Most of the conditions cited above can be managed with some form of visual correction or therapy. The problem is not in how to treat the condition but in the time wasted in not taking care of it. The importance of education and alertness in the child's surrounding (mainly the parents) is critical. Here also, a large proportion (69%) of non-educated parents has been identified as not taking their children's visual problems seriously enough; by failing to seek the help of eye care practitioners urgently. A report by the WHO<sup>(22)</sup> states that simple sight testing and eyeglasses or contact lenses could make a dramatic difference to the lives of more than 150 million people worldwide, who are suffering from poor vision. Some problems may seem insignificant at first but can build up into a complicated condition that may not be easily treated. The awareness of both child and his surroundings (at school and at home) will definitely be in the interest of the child's vision. Strategies such as vision screening programs and eye health promotion need to be implemented, the quality of refractive services monitored and the cost of spectacles regulated, if the substantial burden

of visual impairment due to refractive error in this population is to be reduced. Avoidable blindness and impaired vision carry significant social and economic costs. Children fail at school, adults are unable to work and families are pushed into poverty as a result of uncorrected visual impairment.

Much is still required in information, publicity and public education to increase the level of awareness to refractive error correction. More studies and especially more focused ones are needed to investigate the problem of refractive error prevalence and compliance in order to be able to design efficient programs for the combat of blindness and low vision in the country.

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