

Awareness and Attitude toward Refractive Error Correction Methods: A Population Based Study in Mashhad

Saber Moghaddam Ranjbar AK¹, Pourmazar R^{2*}, Gohary I³

¹ Associate Professor of Ophthalmology, Eye Research Center, Faculty of medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

² Khatam Al Anbia Hospital. Mashhad University of Medical Sciences, Mashhad. Iran.

³ Eye Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.

ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original Article</p>	<p>Objectives: This study was designed to determine the level of awareness and attitude toward refractive correction methods in a randomly selected population in Mashhad, Iran.</p> <p>Materials and Methods: A random cluster sampling method was applied to choose 193 subjects aged 12 years and above from Mashhad population. A structured questionnaire with open-ended and closed-ended questions was designed to gather the participants' demographic data such as: gender, age, educational status and occupation, as well as their awareness and attitude toward refractive correction methods (Spectacles, Contact lenses and Refractive surgery).</p> <p>Results: In overall, 39% of the participants had a clear perception of 'ophthalmologist' and 'optometrist' terms. 80.3%, 87% and 71% of respondents had no information of contact lens application instead of spectacles, cosmetic contact lenses and contact lenses with both refractive correction and cosmetic properties, respectively. 82.5% of participants were not aware of the possibility of refractive surgery for improving their eyesight and decreasing their dependency on spectacles. Awareness about contact lenses and refractive surgery's adverse effects were only 16% and 8%, respectively.</p> <p>Conclusion: Awareness and perception of refractive correction methods was low among the participants of this study. Although, ophthalmologists were the first source of consultation on sight impairments among respondents, a predominant percentage of subjects were not even aware of obvious differences between an ophthalmologist and an optometrist. These findings emphasize the necessity for proper public education on ophthalmic care and the available services, specially the new correction methods for improvement of quality of life.</p>
<p><i>Article history:</i> Received: 23- Aug-2013 Accepted: 16-Sep-2013</p>	
<p><i>Keywords:</i> Attitude Awareness Refractive correction Refractive error</p>	

► Please cite this paper as:

Saber Moghaddam Ranjbar AK, Pourmazar R, Gohary I. Awareness and Attitude toward Refractive Error Correction Methods: A Population Based Study in Mashhad. Patient Saf Qual Improv. 2013; 1(1): 23-29

Introduction

Sight is an important indicator of health and quality of life (1). Uncorrected refractive errors are a major cause of visual impairment and blindness, globally. The World Health Organization has made refractive error

correction a priority in the global initiative to eliminate avoidable blindness: Vision 2020—the Right to Sight (2). It is estimated that 153 million people worldwide have distance vision worse than 20/60 due to uncorrected refractive errors (3, 4). The prevalence of different refractive errors in Iran is not exactly known. In 2011, the

* Corresponding Author: E-mail: pourmazarr871@mums.ac.ir; Tel: +985117281401;

© 2013 mums.ac.ir All rights reserved.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Mashhad Eye Study showed that the prevalence of myopia and hyperopia in individuals >15 years is 22.36% (95%CI: 20.06-24.66) and 34.21% (95%CI: 31.57-36.85), respectively. The prevalence of astigmatism was 25.64% (95%CI: 23.76-27.51) (5).

There is no single method for correction of refractive errors that is either appropriate for or appealing to all patients. Some patients choose spectacles as the best choice, whereas contact lenses or refractive surgery are the correction method of choice in other circumstances (6). The American Academy of Ophthalmology reported that refractive examinations cost patients 1 billion dollars (7). On the other hand, refractive correction is a \$22.8 billion industry in the United States, with 59% of the US population possessing a refractive correction (8). So, refractive errors do not only impose a heavy financial burden on the society but also if left uncorrected could significantly affect patients' independence, quality of life and well-being (9).

As refractive errors are common in our region, previous studies have examined their prevalence and related factors. Yet, to our knowledge, there is no complete and documented survey on the perception and insight of the public about refractive errors correction methods. Therefore, we decided to perform this study for a better understanding about the level of awareness and attitude of the general population toward refractive correction. We do hope our findings would offer useful details for proper public health policies and better eye services.

Materials and Methods

This survey was conducted in Mashhad, Iran between March and August 2011. A random cluster sampling method was applied to choose 193 subjects aged 12 years and above. Prior to commencement of the study, ethical clearance was received from the ethical committee of Mashhad University of Medical Sciences (MUMS), Iran. An informed verbal consent was also obtained from all participants by the research coordinator.

A structured questionnaire was designed to gather information related to the awareness and insight of the general population on refractive correction (Table 1). Initially, all questions of the questionnaire used in this study were assessed by a team consisting of the MUMS Eye Research Center ophthalmologists and two psychiatrists regarding the clarity of questions in Persian language, ease of comprehension and psychological aspects of the questionnaire. Then, adjustments were made accordingly. The questionnaire had been standardized in a pilot

study. Results from that study were not included in the main survey.

The questionnaire comprised of five sections with 25 brief questions, both closed and open-ended. Closed-ended questions were in the form of Yes/No and multiple choice with an option for "other". Open-ended questions were added to double-check the respondent answers to the related closed-ended questions. The first section contained questions according to demographic data such as gender, age, educational status and occupation. The second part was set to evaluate the ability of respondents to distinguish between an ophthalmologist and an optometrist. The remaining sections were arranged to assess respondents' attitude toward spectacles, contact lenses and refractive eye surgery.

All interviewees were asked to answer the closed-ended questions by placing a "x" mark over the box next to the response that they have chosen. Also, there was enough space after every open-ended question for respondents' answers. All questionnaires were filled in with the assistance of our trained interviewers.

Statistical data analysis was conducted using Statistical Package for Social Sciences (Version 19, SPSS, Inc., in Chicago, IL, USA). The Chi-square test was applied to identify differences between the studied variables as well as simple frequency tables to establish the frequency distribution of the responses. The threshold for statistical significance was set at a P-value less than 0.05.

Results

Out of the 193 respondents, 85 (44%) were male and 107 (56%) were female. Their mean age was 30.45 ± 13.45 years (range: 12-76 yrs). 53.7% of the subjects were placed in the 20 to 40 years age group, 22% were under 20 years of age and the remaining 20% belonged to the 40-60 years age group. Figure 1 shows the frequency distribution of different educational levels among the cohort. The majority of subjects (68; 35.2%) were unemployed, 43 (22.3%) self employed, 20 (10.4%) were students and 15 (7.8%) were employees.

Ophthalmologist vs. Optometrist through the eyes of respondents

70% (135) of the participants had their eyes examined at least once from which 67 (31.6%) had visited an ophthalmologist, 36 (18.7%) an optometrist and 23 of them (11.9%) had visited both. The remaining 15 (7.8%) were those who although had eyes examined but could not tell the difference between an ophthalmologist and an optometrist. When participants were asked about

the differences between an ophthalmologist and an optometrist, the majority of them (61% - 118 cases) could not distinguish between them. Only 75 (39%) correctly identified an ophthalmologist as the person who is responsible for diagnosing and treating eye-related diseases and an optometrist as the person who tests people's vision and orders glasses for them. Seven (3.6%) cases of the latter mentioned group had less than 20 years of age, 65 (33.7%) were between 20 and 60 and 3 (1.5%) were older than 60 years.

There was a significant correlation between the awareness of respondents about the differences of an ophthalmologist and an optometrist with their educational status ($p < 0.0001$) (Figure 1) and age ($p = 0.004$). But their gender did not seem to have much influence on the matter ($p > 0.05$).

Spectacles Awareness and Attitude

104 (54%) participants already had a history of wearing spectacles, while 34 (17.5%) believed glasses have limiting effects on their daily lives (e.g. when swimming, taking a bath, etc.); 55 (28.5%) did not believe so and the remaining 15 cases were neutral in this respect.

From the 80 (41.15%) subjects who used spectacles at the time of this study, 25 (13%) individuals complained about not being able to use sunglasses whereas the rest (28.5%) did not have any complaints.

Concerning the costs of spectacles and contact lenses, the participants believed that, in average, spectacles cost 573000 ± 259000 Rials (ranging from 100.000 to 1000.000) per year whereas contact lenses cost 851000 ± 838000 Rials (ranging from 100.000 to 4.500.000) per year. Therefore, according to the participants' viewpoints the estimated cost of contact lenses is significantly higher than spectacles in one year ($P = 0.02$).

Contact Lens Awareness and Attitude

A staggering 80.3% of respondents were not aware of contact lens usage instead of spectacles. There was a significant statistical correlation between the individual's educational level and their knowledge about contact lenses usage instead of glasses ($P = 0.01$).

Only 14 (7.2%) participants already had a history of contact lens wearing. Among them, 5 (2.6%) had got their contact lenses based on ophthalmologist prescriptions whereas 6 cases (3.1%) had consulted with an optometrist. The remaining 3 (1.5%) were not able to distinguish an ophthalmologist from an optometrist. Consequently, they did not answer this question.

Participants' awareness of contact lens side effects stood at the low percentage of 16% (31 subjects). In a sharp contrast, a considerable percentage of the studied cases (84%; 162 cases) had no general knowledge about possible contact lens side effects. Percent frequency of the causes of contact lens disuse among respondents is shown in figure 2.

The majority of cases (87%) were not aware of colored contact lenses worn exclusively for cosmetic purposes on emmetropic eyes. A mere 8 subjects (4%) wore cosmetic contact lenses. Among these subjects, only one person (0.5%) had consulted with an ophthalmologist; 3 (1.5%) had got their contact lenses based on optician orders. The other 4 individuals (2%) had obtained their cosmetic contact lenses from non authoritative sources.

When Participants were asked about their awareness of contact lenses which have both refractive correction and cosmetic properties, 17% were aware of these contact lenses, 12% denied the existence of such contact lenses and 71% were totally ignorant about this issue.

Refractive Surgery Awareness and Attitude

82.5% (151 cases) of the interviewees were not aware that they could do refractive surgery in order to improve their eyesight and decrease or eliminate their dependency on spectacles. From the 34 participants (17.6%) who were aware of refractive eye surgery, one was under 20 and 33 of them were between 20 to 60 years of age. No case over 60 years of age was familiar with this kind of surgery. Only one participant with a higher educational degree had enough information about refractive surgery (Figure 1). There was a significant correlation between the participant's age ($P = 0.001$) and education ($P = 0.0001$) with their knowledge on refractive surgery.

Only 15 (8%) participants out of 178 (92%) had enough information about the side effects of refractive surgery. 8 (4%) participants had the experience of refractive eye surgery out of which 6 (3%) were satisfied with the results but the remaining 2 (1%) participants were not. The frequency percentage of the causes of refractive surgery reluctance among respondents is shown in figure 2.

Table 1: Survey questionnaire

Thank you for your full participation in this questionnaire	
• Section 1:	
Given Name:	Family Name:
Age:	Sex:
Educational status:	Job:
• Section 2:	
<ul style="list-style-type: none"> • Have you ever had an eye examination? Yes No • If yes, please write how many times and for what reason did you have the examination? • If yes, who conducted it? Ophthalmologist Optometrist others please, mention the title. • Do you know the difference between an ophthalmologist and an optometrist? Yes No If yes, please explain it. 	
• Section 3:	
<ul style="list-style-type: none"> • Do you wear glasses? Yes No • Have you ever worn glasses? Yes No • Do you believe that glasses had limiting effects on your daily life? Yes No If Yes, in which aspects? • If you wear spectacles, do you suffer from not being able to use sunglasses? Yes No • Please, write separately your estimation of spectacles and contact lens costs per year. 	
• Section 4:	
<ul style="list-style-type: none"> • Do you aware of contact lens usage instead of spectacles? Yes No If yes, please explain • Have you ever worn contact lenses? Yes No • If yes, how many years? How many hours in a day? • Who prepared the contact lens prescription? Ophthalmologist Optometrist others please, write the title. • Are you aware of possible contact lens side effects? Yes No If yes, please name the side effects. • If you wear glasses but have not had the history of contact lens use; please mention its reason. Lack of information High cost Fear of side effects Non-availability of reliable centers to purchase contact lenses Content with spectacles If others, please write your answer. • Do you have any information about colored contact lenses worn exclusively for cosmetic purposes on normal eyes? Yes No If yes, please explain what do you know about it? • Have you ever worn such cosmetic contact lenses? Yes No • Who prepared such contact lens prescription for you? Ophthalmologist Optometrist others please, write the title. • Are you aware of the presence of contact lenses which have both refractive correction and cosmetic properties? Yes No I do not know 	
• Section 5:	
<ul style="list-style-type: none"> • Are you aware of the possibility of refractive surgery in order to improve the eyesight and decrease or eliminate depending on spectacles? Yes No If yes, please explain what do you know about it? • Are you aware of possible refractive surgery side effects? Yes No If yes, what are its side effects? • Have you had the history of such operation (an eye surgery for refractive correction purposes)? Yes No • If yes, are you satisfied with its results? Yes No • If you wear glasses but have not had the history of refractive surgery; please mention its reason. Lack of information High cost Fear of side effects Non-availability of reliable centers to do such surgery Content with spectacles If others, please write your answer. • If you wear glasses, which refractive correction methods are you interested in? Continuing use of glasses Contact lenses Refractive Surgery 	

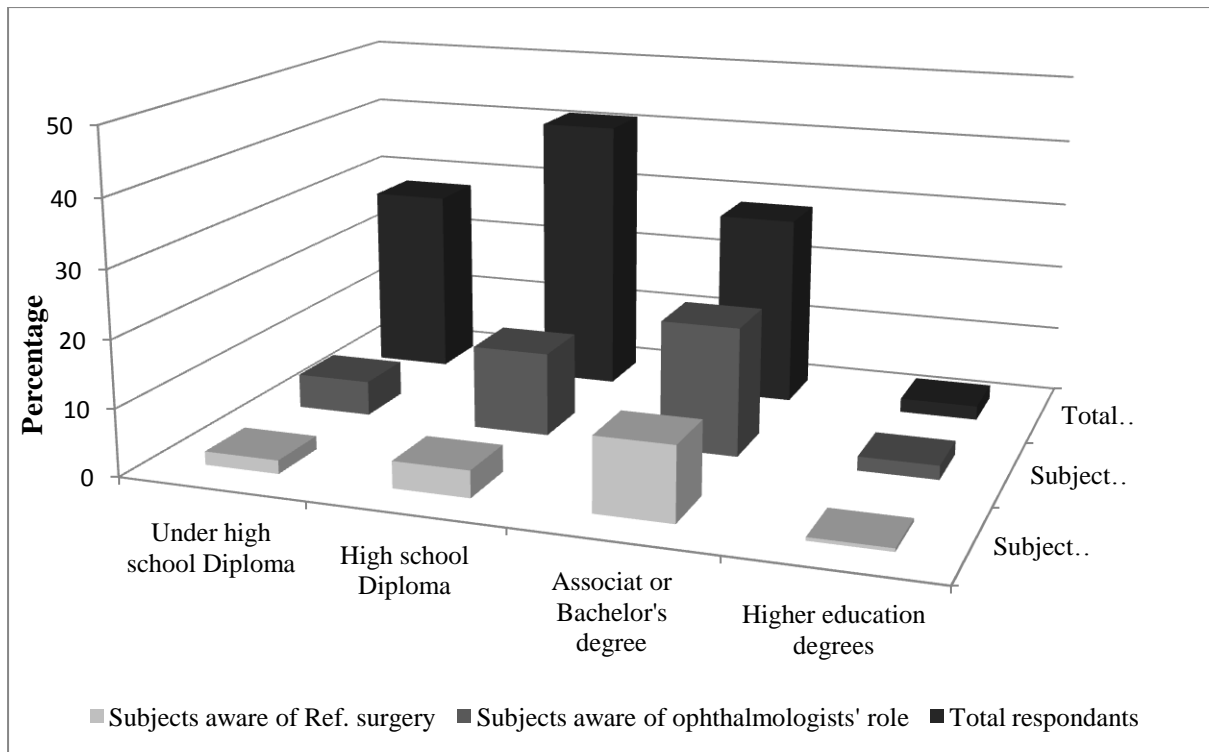


Figure 1: Frequency distribution of different educational levels among all respondents, subjects who were able to distinguish ophthalmologists from optometrists and participants who were aware of refractive surgery

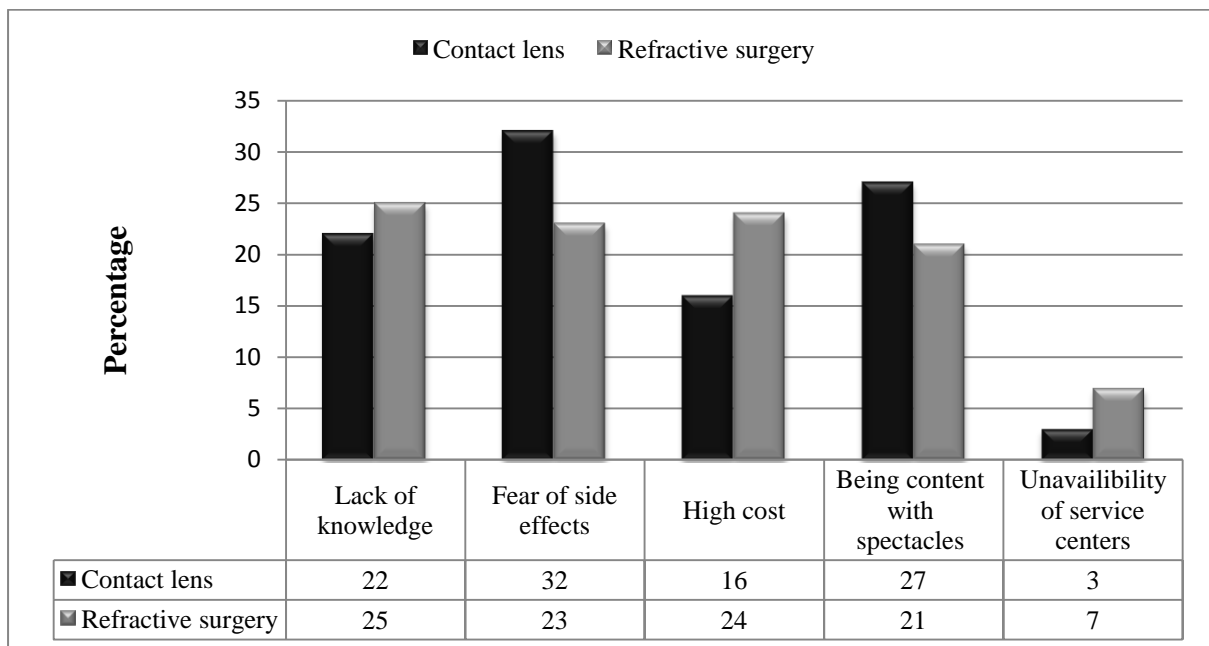


Figure 2: Frequency percentage of the causes of contact lens disuse and refractive surgery reluctance among respondents

Discussion

To the best of our knowledge, this study is the only population-based survey on refractive correction method awareness in the Iranian population and one of the first in our region. Awareness in our study did not mean that participants were aware the topic fully; it merely represented that they had heard about the condition. The obtained results could have a possible significant effect on public health education because it was found that despite the fact that uncorrected refractive errors are a major cause of visual impairment and blindness globally, the level of knowledge about this issue and its correction methods is fairly poor in our region.

In our survey, four in five participants were not aware of contact lens applications. Only 16% of interviewees had general knowledge about possible contact lens side effects. Yet when respondents were asked about the causes of contact lens disuse, surprisingly a high percentage went to fear of side effects with 32%. Similarly, four out of five interviewees were not aware of the possibility of performing refractive surgery in order to improve their eyesight. Just 8% of participants were aware of refractive surgery side effects whereas 23% of respondents unexpectedly mentioned fear of refractive surgery side effects as the main reason for not inclining toward such correction methods.

These findings strongly suggest that not only most of our region's population does not get educated about these subjects by the eye care authorities but also gather information from unreliable sources.

In the present study, there was a considerable correlation between educational status and awareness about contact lens applications and refractive surgery. This result may convey the idea that ocular health educational programs promoting awareness about correction methods, targeted mostly at university level and/or higher educated individuals might be tied to certain socio-economic classes which provide a better access to the eye care services. Although there are no other surveys which have particularly examined the awareness of the general public on refractive error correction methods, several published original researches have revealed the factors affecting the awareness of a population about under corrected refractive errors and other major eye diseases. Similarly, these surveys indicated that awareness and knowledge of such eye diseases were strongly correlated with the individual's educational status (10-16).

A disconcerting result of this survey is the fact that although 70% of the participants had their

eyes examined at least once and ophthalmologists were the first source of consultation on their eye-sight impairments among 31.6% of them, a remarkable number (61%) of subjects were unaware of the obvious differences between an ophthalmologist and an optometrist. Effective health education in eye care may influence the behavior of individuals towards considering regular ocular care. Communicating visual prognosis by primary health care clinicians and primary eye care practitioners would help to increase knowledge and compliance among patients (17) because needless to say, health promotion and communicating risk is a key public health strategy (18-20). These findings emphasize the crucial role of ophthalmologists and optometrists in bringing the general ocular health information to the public attention.

Eventually, after explaining different correction methods and treatment options to the 80 participants who used spectacles at the time of this study, 43.5% were inclined to continue wearing spectacles, 33.5% were enthusiastic about doing refractive eye surgery and 23% were interested in using contact lenses to improve their eyesight.

Conclusion

The results of our study demonstrate major deficiencies in the public awareness about the role of ophthalmologists as well as refractive error correction methods in Mashhad, Iran. Undoubtedly, informing the general public about such important issues is a major step in improving proper ophthalmic services and preventing avoidable visual impairments. Thus, it seems essential for eye care management that ophthalmologists, general practitioners and optometrists provide proper information in details to patients about their refractive error condition and the available correction options.

Acknowledgments

The authors would like to thank the Office of Vice Chancellor of Research of Mashad University of Medical Sciences for financial support.

References

1. Swanson MW, McGwin G. Visual impairment and functional status from the 1995 National Health Interview Survey on Disability. *Ophthalmic Epidemiol.* 2004; 11:227.

2. World Health Organization. Vision 2020. Global initiative for the elimination of avoidable blindness. Fact Sheet No 1213. Geneva: WHO, 2000.
3. Dandona R, Dandona L. Refractive error blindness. *BullWorld Health Organ* 2001; 79:237-43.
4. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *BullWorld Health Organ* 2008; 86:63-70.
5. Ostadimoghaddam H, Fotouhi A, Hashemi H, Yekta A, Heravian J, Rezvan F, et al. Prevalence of the refractive errors by age and gender in Mashhad, Iran: the Mashhad eye study. *Clin Experiment Ophthalmol*. 2011; 39(8):743-51.
6. Riley C, Chalmers RL. Survey of contact lens-wearing habits and attitudes toward methods of refractive correction: 2002 versus 2004. *Optom Vis Sci*. 2005; 82(6):555-61.
7. Zadnik K, Satariano WA, Mutti DO, Sholtz RI, Adams AJ. The effect of parental history of myopia on children's eye size. *JAMA*. 1994; 271:1323-7.
8. Vision Watch. Vision Correction Market Review. New York: Jobson Publishing 2003.
9. Wolffsohn JS, Bhogal G, Shah S. Effect of uncorrected astigmatism on vision. *J Cataract Refract Surg*. 2011; 37(3):454-60.
10. 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(1):4-10.
11. Saw SM, Foster PJ, Gazzard G, Friedman D, Hee J, Seah S, et al. Undercorrected refractive error in Singaporean Chinese adults: the Tanjong Pagar survey. *Ophthalmology* 2004; 111:2168-74.
12. Liou HL, McCarty CA, Jin CL, Taylor HR. Prevalence and predictors of undercorrected refractive errors in the Victorian population. *Am J Ophthalmol* 1999; 127:590-6.
13. Attebo K, Mitchell P, Cumming R, Smith W. Knowledge and beliefs about common eye diseases. *Aust N Z J Ophthalmol* 1997; 25:283-7.
14. Dandona R, Dandona L, John RK, McCarty CA, Rao GN. Awareness of eye diseases in an urban population in southern India. *Bull World Health Organ* 2001; 79:96-102.
15. Livingston PM, McCarty CA, Taylor HR. Knowledge, attitudes, and self care practices associated with age related eye disease in Australia. *Br J Ophthalmol*. 1998; 82:780-5.
16. Noertjojo K, Maberley D, Bassett K, Courtright P. Awareness of eye diseases and risk factors: identifying needs for health education and promotion in Canada. *Can J Ophthalmol*. 2006; 41:617-23.
17. Sathyamangalam RV, Paul PG, George R, Baskaran M, Hemamalini A, Madan Rv, et al. Determinants of glaucoma awareness and knowledge in urban Chennai. *Indian J Ophthalmol*. 2009; 57(5):355-60.
18. Garber N. Health promotion and disease prevention in ophthalmology. *J Ophthalmic Nurs Technol*. 1990; 9:186-92.
19. Javitt JC. Preventing blindness in Americans: The need for eye health education. *Surv Ophthalmol*. 1995; 40:41-4.
20. Cook PA, Bellis MA. Knowing the risk: relationships between risk behaviour and health knowledge. *Public Health*. 2001; 115:54-61.