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Original Article

Refractory Errors; Myopia V/S Hypermetropia And Eye Correction Techniques Used Among Adult Population Visiting A Tertiary Care Health Facility

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Abstract

Background: Uncorrected refractory errors are one of the major causes of avoidable disabilities all over the world. Eye correction is a commonly used treatment technique for most of the refractive errors. We attempted to assess the frequencies of myopia and hypermetropia in adult population and also the magnitude of eye correction techniques used for these conditions.

Methods: This descriptive cross-sectional study was conducted in the outpatient departments of the allied hospitals of Rawalpindi Medical University. Adult attendants of the patients coming in OPD were selected through stratified random sampling. Participants with any ophthalmological condition other than myopia or hypermetropia, or any other known medical, surgical or gynaecological condition were excluded from the study. Auto-refraction was performed by optometrist followed by an assessment of visual acuity using Snellen's chart for far vision. Information was also collected regarding eye correction techniques being used by already diagnosed patients.

Results: Out of 207 study participants refractive errors were diagnosed in 87 (42%) participants whereas 120 (58%) participants had emmetropia. Amongst 87 patients with refractive errors, 77 (88.5%) participants had myopia, 7 (8%) were hypermetropic and 3 (3.4%) had both myopia and hypermetropia. 45 (51.7%) participants were already known cases of refractory errors previously and only 51.1% of those were using spectacles for correction whereas none of them had ever used contact lenses or corrective laser or surgical intervention for any correction.

Conclusion: Myopia was the commonest refractory error diagnosed whereas hypermetropia and both hypermetropia and myopia concurrently were exceedingly rare. None of the already known cases of refractive errors had ever used contact lenses or laser or surgical intervention for correction where only half of them were using spectacles

Key words: Refractive Errors, Myopia, Hyperopia, eyeglasses, laser therapy, age distribution, gender.

Introduction

Uncorrected refractory errors are one of the major causes of avoidable disabilities all over the world.[1] Due to their earlier onset compared with cataract, they can account for twice as many blind people per year.[2] Two types of refractory errors; Myopia and Hypermetropia mean, parallel rays of light entering the eye are focused in front and behind the retina, respectively. Spectacle use is not a causative treatment for refractory errors but they can alleviate the condition to an extent, moreover its cheap and effective.[3] Other techniques for correction include use of contact lenses. Surgical treatment methods like Photorefractive keratectomy (PRK), Laser epithelial keratomileusis (LASEK) and Laser in situ keratomileusis (LASIK) are also available.

Morbidity is an inevitable consequence of refractory errors along with social and economic implications.[4] Hence global initiative for elimination of avoidable blindness by WHO is known as 'Vision 2020 right to sight' programme.[5]

Refractive errors are a matter of great significance as they have affected 2.3 billion people worldwide.[6] The Singapore Indian Eye Study conducted on Indian population observed 28.0% and 4.1% Myopia and High myopia respectively while prevalence of hypermetropia was 35.9%.[7] Another study in US, Western European and Australian population determined prevalence of hypermetropia of +3D or more as 9.9%, 11.6% and 5.8% respectively, and for Myopia of -1D or less 25.4%, 26.6% and 16.4% respectively.[8] In Pakistan a similar study in 2015 showed Hypermetropia (10.14%) as the commonest refractive error followed by Myopia (6.00%).[9] Another

study by Pakistan National Eye survey in 2008 revealed prevalence of spectacles use to be 4.00%.[10]

In Pakistan not only is the prevalence of refractory errors high but the awareness among people regarding spectacle use is also not widespread. Few decades back spectacles and lenses were the only option for correction of refractive errors but now internationally advanced correction techniques like surgery have recently transformed to even latest laser vision correction procedures. But unfortunately our population is still not compliant with simplest correction procedures like spectacles and lenses.

So we conducted this study firstly to have an insight into the magnitude of refractory errors i.e., myopia and hypermetropia in our adult population, and secondly to explore the common corrective means like spectacles or contact lens or any other interventional treatment for these refractory errors. The objectives of our study were to determine the prevalence of refractory errors (myopia and hypermetropia) among adult healthy attendants visiting the outpatient departments of three tertiary care hospitals of Rawalpindi, to determine the proportion of people using different options of corrections for these refractory errors.

Materials and Methods

This descriptive cross-sectional study was conducted in the Out Patient and Ophthalmology departments of the three Allied hospitals of Rawalpindi Medical University i.e. Holy Family Hospital, District Head Quarters Hospital and Benazir Bhutto Hospital. The study was conducted over a period of one month i.e. from July 2016 to August 2016. Considering the convenience of assessment of the study population's refractory errors in ophthalmology department, the study was conducted on the attendants, aged 18 to 40 years, accompanying their patients to the outpatient departments of the three tertiary care hospitals. Participants with any ophthalmological condition other than myopia or hypermetropia or any other known medical, surgical or gynaecological condition were excluded from the study. For minimally required sample size calculation, WHO sample size calculator was used for all three study variables which were, expected percentage of myopia[9], expected percentage of hypermetropia[9] and expected percentage of use of corrective spectacles or lenses [10], and the largest sample size was selected. Keeping the level of confidence to 95% and absolute precision to 5%, the sample sizes were calculated to be 87, 141 and 60 respectively; however, we included 210 participants in our study, 70 from each of the three hospitals. Three participants were dropped later due to incomplete data collection hence 207 were the total study participants.

Study participants were selected through stratified sampling technique. The list of patients entered in the register of outpatient departments of seven specialities of each hospital was used as the sampling frame work. From the list, ten patients from waiting area of each department's OPD were selected, based on the already prepared random number list generated using SPSS software. It comprised of 15 randomly selected numbers from a total of 30 invented numbers. Each patient in each department's OPD register was assigned identity numbers in chronological order. For each selected patient, his/her attendant fulfilling the criteria was selected. In this way 10 attendants from each department's OPD and total of 210 were included. After explaining the purpose and procedure of the study, informed verbal consent was taken. First of all, their profile was entered into structured checklists then they were requested to accompany investigators to refraction room where first Auto-Refraction was performed on them by Optometrist via auto refractor followed by subjective visual acuity testing through Snellens chart. All examinations were performed free of cost for each patient. Myopia was defined as spherical equivalence of or less than -0.5D and Hypermetropia as spherical equivalence of +0.5D or more. People having ophthalmic problems other than the two mentioned refractory errors were excluded from the study. All the information was recorded in structured checklists, then brief interview was conducted from each participant diagnosed as having either of the above refractive errors, regarding prior knowledge of the error and any corrective procedure used, recording their responses in the proforma. The data was entered and analyzed using Statistical Package of Social Sciences version 22. Descriptive statistics like means and median along with standard deviations for numerical variable and frequencies along with percentages for categorical variables were calculated. Cross tabulations were also constructed for various categorical variables.

Results

Out of 207 subjects 117 were males (56.5%) and 90 were females (43.5%). The median age of study participants was 26 years, mean age was 27.24 years ± 6.64 years with youngest participant being 18 years and eldest 40 years old. 120 participants (58%) had emmetropia while 87 participants (42%) had refractive

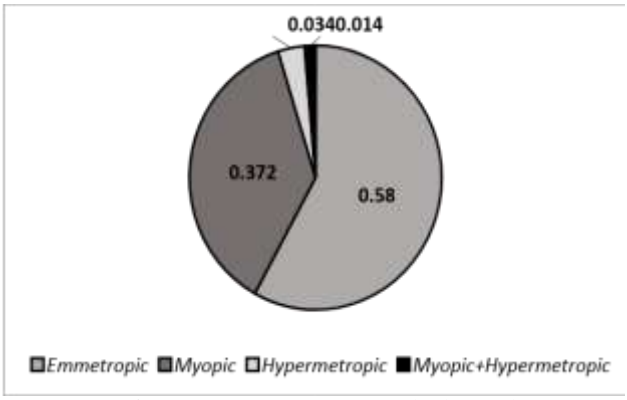

Figure I: Refractory errors among studied population

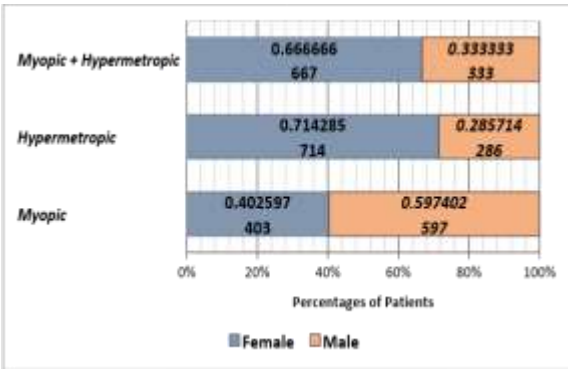

Figure II: Gender distribution of the refractory errors:

errors. Mean age of emmetropic participants was 26.28 years ± 6.57 years while the mean age of participants with refractory errors was 28.56 years ± 6.55 years. The incidence of different refractory errors is shown in the figure I. Mean age of participants with myopia was 28.25 years ± 6.49 years while that of hypermetropics was 32.14 years ± 7.26 years and for participants with both myopia and hypermetropia concurrently was 28.33 years ± 6.02 years. The gender distribution of participants with refractory errors is displayed in figure II. Amongst the 87 participants with refractory errors, 45 (51.72%) were already aware of their refractive errors, however 42 (48.27%) were diagnosed for the first time during this study and were prescribed correction accordingly. Amongst 45 already known cases, only 23 participants (51.11%) were using spectacles for the correction of refractory errors, amongst these 22 (48.88%) were myopic (having myopia alone or along with hypermetropia) and only 1 (2.2%) had hypermetropia (hypermetropia alone or along with myopia). Amongst those 23 participants using spectacles 12 were males (52.172%) and 11 were females (47.82%). None of the 45 already diagnosed cases were aware of their refractory errors or had ever used contact lenses or any other laser or surgical intervention for their refractory errors.

Discussion

This study was conducted to find the frequency of myopia and hypermetropia in our adult population and the proportion of people using correction methods. A lot of people have refractory errors and either they are not aware of these or they do not bother to get correction via spectacles or contact lens. This leads to harmful consequences regarding their vision and many people are unaware of them.[11] Our Study revealed Myopia as the most prevalent refractory error in our adult population (37.2%). This is in accordance with the study based on US, Western Europe and Australian population where rate for myopia was 25.4%, 26.6% and 16.4% respectively.[8] In the same study the frequencies of hypermetropia were 9.9%, 11.6% and 5.8% respectively[8], whereas in our study it was 3.4%.

A study on Indian population reported hypermetropia to be the most prevalent refractory error in 35.9% participants while myopia and high myopia was seen in 28.0% and 4.1% participants respectively.[7] In Pakistan, a study conducted in Ayub Medical College Abbottabad in 2015 also reported hypermetropia to be more prevalent than myopia in 10.14% and 6.0% participants respectively.[9] Results of these studies contradict that of ours probably because in our study participants maximum age was 40 whereas in these studies maximum age was > 40 years. Hypermetropia does not occur in young adults. It is a senile process gaining peak as age progresses because with age the accommodative power of eye exhausts leading to hypermetropia. A study conducted by Pakistan National Eye Survey Study Group revealed the prevalence of myopia as 36.5% and hypermetropia as 27.1%.[10] Another study in Ziauddin University hospital Kemari, Karachi had results similar to our study with myopia and myopic astigmatism being more common in 39% and 51.1% respectively.[2]

In our study, the rate for spectacle use is 51.1%, 48.8% in myopics 2.2% in hypermetropics .A study by Pakistan National Eye Survey Study showed that 15.1% participants used spectacles.[10] The reason for this difference between these two studies is that with advancing era, awareness status of people is increasing.

None of our study participant was using contact lenses whereas percentage of contact lens wearers in the survery populations in Singapore was 9.0%.[11] Moreover none of our study participants had ever

used any other corrective intervention like laser or surgery due to poor predictability.[12]

Conclusion

Almost half of all the study participants had refractory errors, amongst whom myopia was the commonest refractory error whereas hypermetropia and both hypermetropia and myopia concurrently were exceedingly rare. None of the already known cases of refractive errors had ever used contact lenses or laser or surgical intervention for correction whereas only half of them were using spectacles.

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