

Original Research Article

Community based cross-sectional survey to assess the conditions of refractive error by eye-screening program in remote area of Saifai, Etawah

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ABSTRACT

Background: Refractive error is a state where an optical system of the eye fails to bring parallel light rays on a point focus at the fovea, due to increase or decrease of the size of the eyeball through any reasons, changes in the refractive index of the component of the eyes or the age related factors.

Methods: A community-based cross-sectional survey was conducted in the systemic random sampling without repetitions (SRSWOR) method at the circumference area of 5 km of the Saifai Medical University UPUMS Saifai, Etawah (Uttar Pradesh). The data was collected through the rural program for the control of blindness. Among 1032 samples, for the refractive error, total 237 individuals were registered for the study through the screening programme.

Results: The age group 0-19 years concludes 22 (9.28%), for 20-39 concludes 71 (22.95%), for 40-59 years concludes 101 (18.14%) and for the age group above 60, it was 43(48.94%) respectively. Among all the age groups a total of 22.96% responders were diagnosed for the prevalence of refractive error and it was observed more for females 50.63% as compared to males 49.36%.

Conclusions: The prevalence of refractive errors refers to the age group of 40-59 years, so for early diagnosis eye care must be included at a particular time difference at a community level through an eye screening program for all the age groups with the main intention to give special cover to the age group of 40-59 years.

Keywords: Astigmatism, Eye screening program, Hypermetropia, Myopia, Refractive error

INTRODUCTION

The Right for Sight slogan of “Vision 2020” has its aims to eliminate visual impairment and the refractive error is

the most common factor to produce the visual impairment. The refractive error is a condition where light rays fail to falls on the retina due to either increase or decrease in the axial length of the eye and other causes

problems with the shape of the cornea (the clear outer layer of the eye). Children are requiring attention for the refractive errors as the various studies say about the high prevalence of myopia, Hypermetropia, and astigmatism.¹ Refractive error is considered first for the most common cause of visual impairment and thereafter for blindness all over the world. Globally the total number of people of all ages with visual impairment is 253 million, of which 36 million are blind.² Therefore this uncorrected vision (43%) causes visual impairment; beyond this, about 217 million people have low vision in the world too.³ The known three types of refractive errors commonly causing visual impairment are myopia, hypermetropia, and astigmatism. Myopia becomes nearly progressive and generally appears in childhood and adolescence.¹ Hypermetropia is a leading sight problem and associated with the issues of trouble in near vision.⁴ Astigmatism results from blurred or distorted vision and this condition led to the difference of curvature either of the cornea at its both the meridians (corneal astigmatism) and the shape distortion of the lens (lenticular astigmatism).⁵

The majority of blind people on earth reside in the developing nations of Africa, Asia, and Latin America.⁶ The need for spectacles for presbyopia is already a major driver encouraging people to seek eye care. There are several studies on the prevalence of visual impairment in the world.⁷ A nation-wide survey on the magnitude and causes of blindness and cataract surgical outcomes was carried out in 15 randomly selected districts in 15 states in the country during the period 1998-2002.⁸ and observed that urban children had higher risk of developing refractive errors.⁹ Due to the absence of appropriate community-based data in Uttar Pradesh University of Medical Sciences, Saifai, Etawah, the current research aims to evaluate the prevalence of refractive errors Saifai Etawah, regions. In future, specific interventions programs should be implemented to minimize the burden of refractive error.

METHODS

This random, cross sectional prospective study was conducted through the community outreach programme and the sample size of 1032 picked through eye screening camp around circumference of 5 km of Saifai Medical University UPUMS Saifai, Etawah (Uttar Pradesh) from November, 2017 to March, 2018.

The selective area for the study was rural area where people are not aware about the complications and different adverse eye conditions related to refractive errors, so the objective of our study is to measure the significance and to make analyse in the percentage of refractive errors at four varying sub age groups (0-19), (20-39), (40-59), (60+) and to make awareness about those conditions in remote area of Saifai town.

All the data was obtained through the study; statistical analysis was done using statistical analysis was

performed with statistical package for the social sciences (SPSS) version 15. For this study consent is taken for conducting the study through villagers and school's students or from their respondents.

Patients who were diagnosed with refractive error and fulfilling the inclusion criteria further selected for the study. The 1032 subjects were randomly observed without repetitions (SRSWOR) and among them the sample size was taken 237 and which constituted the sample size of the study. The inclusion criteria are consisting of male and females of the age group 0-19, 20-39, 40-59 and 60 above patients¹⁰, Refractive Error like Myopia, hypermetropia and Astigmatism, and Ratio of Normal visual acuity Hypermetropia with +1DS and the astigmatism ($> +0.75D$) 11.

The exclusion criteria are consisting of the excluded patients were with the defects like corneal opacity, Amblyopia, choroid and retinal disorders, Pterygium, Glaucoma, hypertensive and diabetic, Myopia of (-25DS), (-0.50DS) 11 and mentally retarded patients were also excluded from the study. The screening was done from a six meters distance on a Snellen's chart. Those with visual acuity less than 6/9 were subjected for refraction test and the Subjective assessment and evaluation of refractive error was done on the spot. If the refraction is not achieved satisfactory then patient was asked to visit at tertiary eye care hospital for the cycloplegic retinoscopy test.

Post diagnosis with refractive errors the patients were asked to complete the pre-designed, pre-tested questionnaire focusing on socio-demographic variables. The sample size is calculated to show the prevalence of refractive error among varying age groups.

RESULTS

The sample size of 1032 picked through eye screening camp around circumference of 5 KM of Saifai Medical University UPUMS Saifai, Etawah (UP), among them 237 samples are found affected with the refractive error. Further study made fewer than 4 sub-groups of age ranging 0-19, 20-39, 40-59 and 60 and above. The male count was high with 121 (51.05%) as compared to female count 116 (48.94%) (Figure 1).

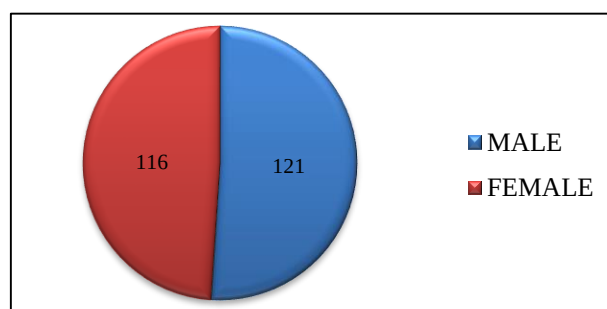


Figure 1: Gender distribution.

According to the age group category 0-19 years, there were 22 (9.28%) samples concluding 14 (12.17%) males and 8 (6.55%) females, the age group of 20-39 years have 71 (29.95%) samples concludes 28 (24.34%) males and 43 (35.24%) females, the age group of 40 -59 have 101 (42.61%) samples concludes 48(41.73%) male and 53 (43.44%) females and the age group of 60 and above have 43 (18.17%) samples concluding 31(26.95%) males and 12 (9.83%) females (Table 1, 2,3).

Table 1: Age groups and sample frequency.

Age groups (in years)	Frequency (%)
0-19	22 (9.28)
20-39	71 (29.95)
40-59	101 (42.61)
60 and above	43 (18.14)

Table 2: Different age groups and gender.

Age groups (in years)	Male (%)	Female (%)	Total
0-19	14 (12.17)	8 (6.55)	22
20-39	28 (24.34)	43 (35.24)	71
40-59	48 (41.73)	53 (43.44)	101
60 and above	31 (26.95)	12 (9.83)	43
Total	121 (51.05)	116 (48.94)	237

Table 3: Different types of errors according to frequency.

Refractive error	Frequency (%)
Myopia	120 (50.6)
Hyperopia	52 (21.90)
Astigmatism	65 (27.4)
Total	237 (100)

The different types of refractive errors, viz myopia, hyperopia and astigmatism have their frequency of 120 (36.39%), 52 (15.90%) and (19.87%) respectively. Further the Myopia concludes 80 (59.25%) males and 40 (39.21%) females. The hypermetropic error concludes 30 (22.22%) males and 22 (21.56%) females; remaining astigmatic error concludes 25 (18.51%) males and 40 (39.21%) females (Table 4).

Table 4: Different types of errors and gender.

Refractive error	Male (%)	Female (%)	Total (%)
Myopia	80 (59.25)	40 (39.21)	120 (50.6)
Hyperopia	30 (22.22)	22 (21.56)	52 (21.90)
Astigmatism	25 (18.51)	40 (39.21)	65 (27.4)
Total	135	102	237

In this study prevalence of refractive error is found for the Myopia with the sample size of 120 (36.39%), further it is observed for the male gender counting of 80 samples

(59.25%). The refractive error prevalence for the age group is counted in the 40 -59 years, with the count of 101 (42.61%) and the dominating gender was female, count 53 (43.44%) (Table 5).

Table 5: Different types of errors and gender distribution

Age groups (in years)	Refractive errors			Total
	Myopia (%)	Hyperopia (%)	Astigmatism (%)	
0-19	22 (9.28)	4 (1.68)	11 (4.64)	37
20-39	45 (18.98)	8 (3.37)	29 (12.23)	82
40-59	35 (14.76)	19 (8.01)	12 (5.06)	66
60 and above	18 (7.59)	21 (8.86)	13 (5.48)	52
Total	120	52	65	237

The refractive error although has no direct concern of either increase and decrease with the age (except childhood) but in this study it is found that the hypermetropic error increases with the age, while myopic error with the astigmatic error increases from the age group of 0-39 years to 20-39 years and then myopia reduces, although astigmatic error being constant till the age of 60 years.

DISCUSSION

The magnitude of refractive error and its type is very essential for all eye care practitioners as it is count major public health issue in the community.¹² Several population-based refractive errors studies focus on the pattern of refractive errors and visual impairment in different territories.¹³⁻¹⁵ In India incidence rate of attending eye OPD vary between 21% and 25% and according to Mattha et al the overall prevalence of refractive errors was found to be 12.5%.^{8,9} In that comparison our study indicates it about 22.96% and the prevalence of refractive error was for male with the count 121 (51.05%) instead of female count 116 (48.94%). Refractive error, especially myopia, is a common problem in the young people, more so in the student community.¹⁶

Midelfart et al reported a prevalence of myopia 35.0% in persons aged 20–25 years and a prevalence of 30.3% in persons aged 40–45 years.^{17,18} In our study prevalence of Myopia 120 (36.39%), male were found more prone with the count of 80 (59.25%) instead of female 40 (39.21%). The age group of 20-39 years has more myopic for 45 (18.98%) samples and the 40-59 years has 35 (14.67%) samples. The total hyperopic count in our study was 52 (15.90%) and according to age group it was high for the 60 years and above with 21 (8.86%) samples, further there were 30 (22.22%) males and 22 (21.56%) females. Similar trend has been found in some population-based studies.¹⁹⁻²¹ The proportion of astigmatism in our study is

65 (19.87%) and is observed 25 (18.51%) in males and 40 (39.21%) in females.

The age group commonly affected is 20-39 years. In many population-based studies astigmatism has been found to be the most common type.²²⁻²⁴ In this study it is found that the hypermetropic error increases with the age it may be due to release of ciliary muscle tone, while myopic error increases from the age group of 0-39 years to 20-39 years and then myopia reduces, may be due to the cataract formation where crystalline natural lens get bulged and compensate the myopic error, in same way irregularities or changes in the properties of the internal components of the eye may lead to show astigmatic error and being reducing up to 20-39 years onward 19 years of age and again show slight change in and up to the age group of 60 years and above.

Limitation

In this study, the selective area for the study was rural area where people are not aware about the complications and different adverse eye conditions related to refractive errors. So, there is a need to do further study on a large scale in large duration. There is a need to do school screening programs and awareness programs on a large scale to make people aware of areas of U.P. University of medical sciences, Saifai Etawah to avoid curable and treatable refractive error.

CONCLUSION

The prevalence of refractive errors was found more in the age group of 40-59 years thereby there is a need of eye care including early diagnosis and timely interventions for prevention of permanent disabilities, and for promotion of eye health at community level. There must be a provision of affordable corrective services which includes regular 6-month eye screening program for all the age group and mainly focusing on 40-59 years. There must be more researches in these conditions in order to determine the magnitude of the problem and what all resources are needed to solve the problem of refractive errors and cataract conditions. So that we will be very near to achieve the goal of Vision 2020.

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