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Incidence of refractive error and analysis through cross tabulation between time spent on computer and family history with refractive error type

Biswajit Mondal

biswajit.mondal@live.com

NIMS University, Jaipur, Rajasthan

Atanu Maulik

atanumaulikdgp@gmail.com

NIMS University, Jaipur, Rajasthan

Dr. Kavita Bhatnagar

rajankavita12@gmail.com

NIMS University, Jaipur, Rajasthan

Himanshu Tripathi

himanshu.tripathi@nimsuniversity.org

NIMS University, Jaipur, Rajasthan

ABSTRACT

The study was conducted with the objective to find out the Incidence of Refractive error and analysis through cross tabulation between time spent on computer and Family history with Refractive Error Type. In this study, 1500 Professional College going students between 18 and 22 years of age, from South Bengal of West Bengal were evaluated. Clinical profiles of refractive errors among students were analysed. This population-based cross-sectional study conducted in randomly selected young professional college students. A structured Case Record Form was implemented to collect the details of the relevant factors. Data were tabulated and analysed using Statistical package (SPSS) and chi-square test, Cross tabulation and Reliability test to get the results. Our respondents were from different professional programs, out of which 585 (39%) were male respondents and 915 (61%) were female respondents. Refractive error diagnosed in 240 (16%) respondents out of which 91 (6%) were male and 149 (9.93%) female respondents. Out of 91 (6.06%) male, 63 (4.2%) myopic, 18 (1.2%) Hyperopic and 10 (.6%) were Astigmatic. Out of 149 (9.93%) female, 102 (6.8%) myopic, 25 (1.66%) hyperopic, 22 (1.46%) astigmatic and no refractive errors were found in 1260 (84%) respondents. The incidence of refractive error showed significant association in univariate analysis with time spent on computer and Family history.

Keywords— *Refractive error, Spectacles, Snellen's chart, Visual impairment, Visual acuity, Cross sectional, Ametropia*

1. INTRODUCTION

Uncorrected refractive error is the most frequently faced reason for visual impairment. An uncorrected refractive error has been recognized as an ocular health problem by the World Health Organization while launching the Vision 2020: Right to Sight initiative, which aims to eliminate avoidable blindness by the year 2020. Several population-based studies have been conducted in various countries to study the prevalence of refractive errors and understand the magnitude of the problem. Refractive error is the most common condition that needs the attention of an Optometrist. The development of ametropia is thought to be the result of interaction between the visual environment and heredity. According to the report of World Health Organization (WHO), it is estimated globally that 285 million people are visually impaired. 39 million are blind and 246 have low vision. 80% of all impaired vision can be prevented or corrected. This study is being carried out with the following objectives:

- The study was conducted with the objective to find out the Incidence of Refractive error and analysis through cross tabulation between time spent on computer and Family history, with Refractive Error Type

2. RESEARCH METHODOLOGY

Our study was an observational, descriptive and cross-sectional. We employed both simple and random sampling techniques for our study. The students of different colleges situated in South Bengal in the state of West Bengal was determined as the study population. We examined 1500 young students for this study. During the screening, we used Snellen's Visual acuity chart both distance and near, trial lens set, occluder, trial frame, Auto refractometer, Ophthalmometer, Heine & Welch Allyn retinoscope. The study period was August 2016 to July 2018. Stratified Random Sampling method was applied.

All the students attending colleges in the urban area of south Bengal, West Bengal included and the students below 18 years and above 22 years of age, Corneal and lenticular opacities, the presence of any ocular infection/inflammation, history of previous ocular surgery, and history of ocular injury were excluded from this study. Visual acuity testing was done using the Snellen's chart form six meters' distance. The permission or consent was taken in Informed Consent Form from every participant. A detailed history was obtained from the respondent's, demographic profile like age, gender, a program of study, with the general, ocular, family history and time spent on the computer. Visual acuity was tested using Snellen's chart for distance as well as near and dry retinoscopy was performed on all the respondents to find out the refractive status. In this study, we defined refractive error as respondents were considered to be myopic when the spherical equivalent was more than or equal to - 0.25D in one or both eyes and hyperopic when the spherical equivalent is more than or equal to + 0.25D and astigmatic when the cylinder power is greater than 0.25D. Near visual acuity, near vision chart held at 40cm from the patient and asked them to read, gives the near visual acuity for that patient. Auto-Refractometry was used to measure refractive error, Ophthalmometry was performed and recorded radius of curvature of anterior curvature of the cornea. Ethical permission for the study was obtained prior to data collection from the Institutional ethical committee of National Institute of Medical Science & Research, Nims University Rajasthan, Jaipur.

3. RESULTS AND DISCUSSION

We have studied 1500 young population, out of which 585 were total male respondents and 915 were female respondents. Refractive error diagnosed in 91 Male and 149 female respondents. Refractive error type was Myopia 165, Hyperopia 43, Astigmatism 32 and No refractive error was in 1260 respondents.

In this Research Work, we have combined quantitative as well as qualitative statistical tools.

Table 1: Overall Prevalence of Refractive Error (RE)

RE Type	Count
1="Myopia"	165
2="Hyperopia"	43
3="Astigmatism"	32
4="No RE"	1260
Total	1500

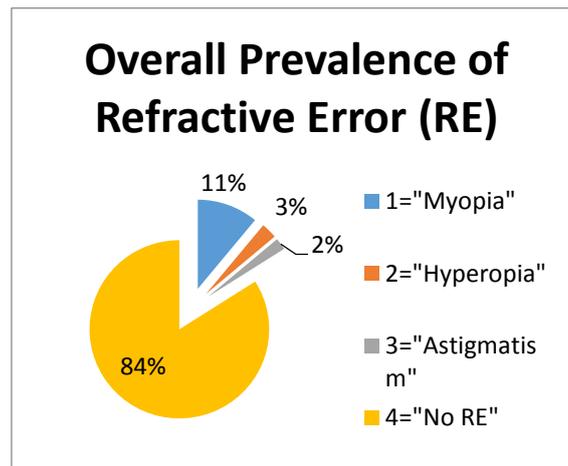


Fig. 1: Overall Prevalence of Refractive Error

Table 2: RE (Refractive Error) Type and Time Spent on Computer

RE_Type * Time_spent_on_computer Crosstabulation

		Time_spent_on_computer			Total
		<1 hr/day	1-3 hrs/day	>3hrs/day	
RE_Type	Myopia	Count	30	22	113
		% within RE_Type	18.2%	13.3%	68.5%
		% within Time_spent_on_computer	28.6%	18.3%	8.9%
		% of Total	2.0%	1.5%	7.5%
		Std. Residual	5.4	2.4	-2.3
Hyperopia	Count	0	3	40	
	% within RE_Type	.0%	7.0%	93.0%	
	% within Time_spent_on_computer	.0%	2.5%	3.1%	
	% of Total	.0%	.2%	2.7%	
	Std. Residual	-1.7	-.2	.6	
Astigmatism	Count	2	4	26	
	% within RE_Type	6.2%	12.5%	81.2%	
	% within Time_spent_on_computer	1.9%	3.3%	2.0%	
	% of Total	.1%	.3%	1.7%	
	Std. Residual	-.2	.9	-.2	
No RE	Count	73	91	1096	
	% within RE_Type	5.8%	7.2%	87.0%	
	% within Time_spent_on_computer	69.5%	75.8%	86.0%	
	% of Total	4.9%	6.1%	73.1%	
	Std. Residual	-1.6	-1.0	.8	
Total	Count	105	120	1275	
	% within RE_Type	7.0%	8.0%	85.0%	
	% within Time_spent_on_computer	100.0%	100.0%	100.0%	
	% of Total	7.0%	8.0%	85.0%	
					100.0%

3.1 RE (Refractive Error- Myopia) type and time spent on computer

After cross tabulation among RE (Refractive Error) Type and Time Spent on Computer it is clearly observed that out of 165 Myopic students 30 students are using computer <1 hr/day, 22 people are using computer 1-3 hr/day, 113 people are using computer >3 hr/day, this is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 18.2 % people are using computer <1 hr/day, 13.3% people are using computer 1-3 hr/day, 68.5% people are using computer >3 hr/day, If we observe the % age time spend on computer, then we are observing that 28.6 % people are using computer <1 hr/day, 18.3 % people are using computer 1-3 hr/day, 68.5% people are using computer >3 hr/day, If we observe the % age of Total, then we are observing that 2.0 % people are using computer <1 hr/day, 1.5 % people are using computer 1-3 hr/day, 7.5% people are using computer >3 hr/day.

3.2 RE (Refractive Error- Hyperopia) type and time spent on computer

After cross tabulation among RE (Refractive Error) Type and Time Spent on Computer it is clearly observed that out of 43 Hyperopia students 0 people are using computer <1 hr/day, 3 people are using computer 1-3 hr/day, 40 people are using computer >3 hr/day, This is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 0% of people are using computer <1 hr/day, 7.0 % people are using computer 1-3 hr/day, 93.0 % people are using computer >3 hr/day, If we observe the % age time spend on computer, then we are observing that 0 % people are using computer <1 hr/day, 2.5 % people are using computer 1-3 hr/day, 3.1% people are using computer >3 hr/day, If we observe the % age of Total, then we are observing that.0 % people are using computer <1 hr/day, 0.2 % people are using computer 1-3 hr/day, 2.7 % people are using computer >3 hr/day.

3.3 RE (Refractive Error- Astigmatism) type and time spent on computer

After cross tabulation among RE (Refractive Error) Type and Time Spent on Computer it is clearly observed that out of 32 Astigmatism students 2 people are using computer <1 hr/day, 4 people are using computer 1-3 hr/day, 26 people are using computer >3 hr/day, this is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 6.2 % people are using computer <1 hr/day, 12.5 % people are using computer 1-3 hr/day, 81.2 % people are using computer >3 hr/day, If we observe the % age time spend on computer, then we are observing that 1.9 % people are using computer <1 hr/day, 3.3 % people are using computer 1-3 hr/day, 2.0% people are using computer >3 hr/day, If we observe the % age of Total, then we are observing that 0.1 % people are using computer <1 hr/day, 0.3 % people are using computer 1-3 hr/day, 1.7 % people are using computer >3 hr/day. This has been also observed that 1260 people have no RE out of 1500.

3.4 RE (Refractive Error) type and family history

Table 3: RE (Refractive Error) Type and Family History

			Family_history_of_RE		Total
			YES	NO	
RE_Type	Myopia	Count	7	158	165
		% within RE_Type	4.2%	95.8%	100.0%
		% within Family_history_of_RE	10.9%	11.0%	11.0%
		% of Total	.5%	10.5%	11.0%
		Std. Residual	.0	.0	
	Hyperopia	Count	2	41	43
		% within RE_Type	4.7%	95.3%	100.0%
		% within Family_history_of_RE	3.1%	2.9%	2.9%
		% of Total	.1%	2.7%	2.9%
		Std. Residual	.1	.0	
	Astigmatism	Count	3	29	32
		% within RE_Type	9.4%	90.6%	100.0%
		% within Family_history_of_RE	4.7%	2.0%	2.1%
		% of Total	.2%	1.9%	2.1%
		Std. Residual	1.4	-.3	
	No RE	Count	52	1208	1260
		% within RE_Type	4.1%	95.9%	100.0%
		% within Family_history_of_RE	81.2%	84.1%	84.0%
		% of Total	3.5%	80.5%	84.0%
		Std. Residual	-.2	.1	
Total		Count	64	1436	1500
		% within RE_Type	4.3%	95.7%	100.0%
		% within Family_history_of_RE	100.0%	100.0%	100.0%
		% of Total	4.3%	95.7%	100.0%

3.5 RE (Refractive Error-Myopia) type and family history

After cross tabulation among RE (Refractive Error-Myopia) and Family History it is clearly observed that out of 165 Myopic, 7 people having a family history of Myopia and 158 do not have the Family history.

This is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 4.2 % people having Family history, 95.8 % people do not have any family history. If we observe the % age of family history then we are observing that 10.9 % of people having Family History and 11.0% do not have any family history.

If we observe the % age of Total, then we are observing that 0.5 % of people having a family history, 10.5 % of people do not have any family history.

3.6 RE (Refractive Error-Hyperopia) and family history

After cross tabulation among RE (Refractive Error- Hyperopia) and Family History it is clearly observed that out of 43 Hyperopia, 2 people having Family history and 41 do not have the Family history.

This is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 4.7 % people having Family history, 95.3 % people do not have any family history. If we observe the % age of family history then we are observing that 3.1 % people having Family History and 2.9% do not have any family history.

If we observe the % age of Total, then we are observing that 0.1 % of people having a family history, 2.7 % of people do not have any family history.

3.7 RE (Refractive Error-Astigmatism) and Family History

After cross tabulation among RE (Refractive Error- Astigmatism) and Family History it is clearly observed that out of 32 Astigmatism, 3 people having Family history and 29 do not have the Family history.

This is also shown in percentage form. If we observe the % age within RE Type, then we are observing that 9.4 % people having Family history, 90.6 % people do not have any family history. If we observe the % age of family history then we are observing that 4.7 % people having Family History and 2.0% do not have any family history.

If we observe the % age of Total, then we are observing that 0.2 % people having family history 1.9 % people do not have any family history.

It is also observed that 1260 people have no Family history of RE out of 1500

4. CONCLUSION

Based on our study, we can conclude that the prevalence of refractive error showed a significantly direct relationship with the socio demographic status of the respondents. A statistically significant association was found between the prevalence of refractive error with the demographic profile of the respondents. By performing the cross tabulation, we found significant relation among time spent on computer and family history with refractive error type. In our study, we have observed that myopia is prevailing among younger students with both age groups (up to 18 years and 19 to 20 years). From this study, it was revealed that 11% of the total population detected with Myopia which is alarming. The study, therefore, highlights the prevalence of undetected refractive error in the college students and the importance of early detection and treatment with corrective spectacles which will help to prevent the further progression of refractive error.

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