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PREVALENCE OF COLOR BLINDNESS AMONG THE STUDENTS OF RIYADH COLLEGES OF DENTISTRY AND PHARMACY

Ebtesam Al Fayez, Ebtehal Al Shammari, Ghada Al Haiid and Dr. Shahzeb H. Ansari*

Department of Dentistry, Riyadh College of Dentistry and Pharmacy.

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***Corresponding Author**
Dr. Shahzeb H. Ansari
Department of Dentistry,
Riyadh College of Dentistry
and Pharmacy.

ABSTRACT

Background: One of the essential steps in a treatment plan is tooth color matching, which if not chosen correctly can lead to unacceptable clinical results. Vision is a psychophysical phenomenon based on the sensitivity of the retina to wavelengths between 400nm to 700nm from the total electromagnetic spectrum. **Aim:** Determine the prevalence of color blind students in RCDP. **Methodology:** This was a cross sectional study, which utilized a questionnaire including Ishihara color test and some questions were added to achieve the above mentioned aims. **Results:** Prevalence of color blindness in males was found to be 5%. Prevalence of color blindness in females was found to be 1%.

Conclusion: Color blindness is a male dominant disorder.

KEYWORDS: Color Blindness, Ishihara color test, male-dominant.

INTRODUCTION /STUDY BACKGROUND

Color differentiation is a very important aspect of dentistry, especially in Prosthodontic and Restorative. One of the essential steps in a treatment plan is tooth color matching, which if not chosen correctly can lead to unacceptable clinical results.

Several studies have taken place in various dental institutions and hospitals to determine the prevalence of color blindness, which may be of different types. A study was conducted in Pakistan which targeted both male and female dentists, stated that there was a small percentage of 4.6% participants having mild to severe forms of color blindness. The majority of the color blind subjects were males, as males are genetically prone to have this disorder (Yousuf et al, 2015).

Vision is a psychophysical phenomenon based on the sensitivity of the retina to wavelengths between 400nm to 700nm from the total electromagnetic spectrum. Color deficiencies can be viewed as if the eye had a different calibration from the normal as far as the relationship between wavelength and perceived color is concerned. There are different types of color blindness. The dental students must be aware of any color deficiency that they might have when practicing dentistry (Moser et al, 1985).

Previously, studies have been conducted to determine the prevalence of color blindness among dental students. Different types of color blindness were found in male dental students from one of the dental universities of Bangladesh. It was noted that there was appropriate counseling done for these students in order to prevent any irregularities in the clinics (Hossain et al, 2013).

Interestingly, there was a study done to compare the efficiency of shade matching performed by color blind and normal dental students. Different shade guides were used to assess the comparison, which included 3D Master and Vita Lumin shade guides. It was reported at the end of the research that the use of 3D Master significantly improved the color matching accuracy among the subjects (Vafaee et al, 2012).

AIMS OF THE STUDY

- Determine the prevalence of color blind students in RCDP.
- Determine the different types of color blindness present.

MATERIALS AND METHODS

- This was a cross sectional study, which utilized a questionnaire including Ishihara color test and some questions were added to achieve the above mentioned aims. Questionnaire was designed using Survey Monkey and sent to the male and female dental students using their email addresses. A total of 300 male and female clinical students took part in this study. The data was then analyzed using SPSS v. 16.

RESULTS

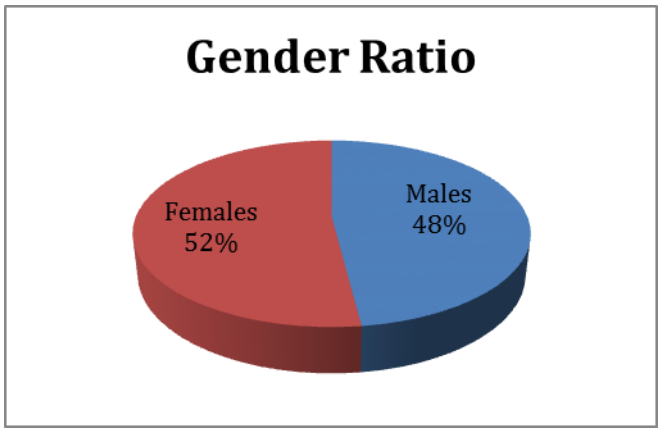

Figure 1: Male to female ratio participating in the study.

Table 1: Prevalence of Eye Problems in Males and Females.

		Eye problem		Total
		Yes	No	
Gender	Male	47(33%)	95	142
	Female	67(46%)	82	149
Total		114	177	291

P value: 0.042.

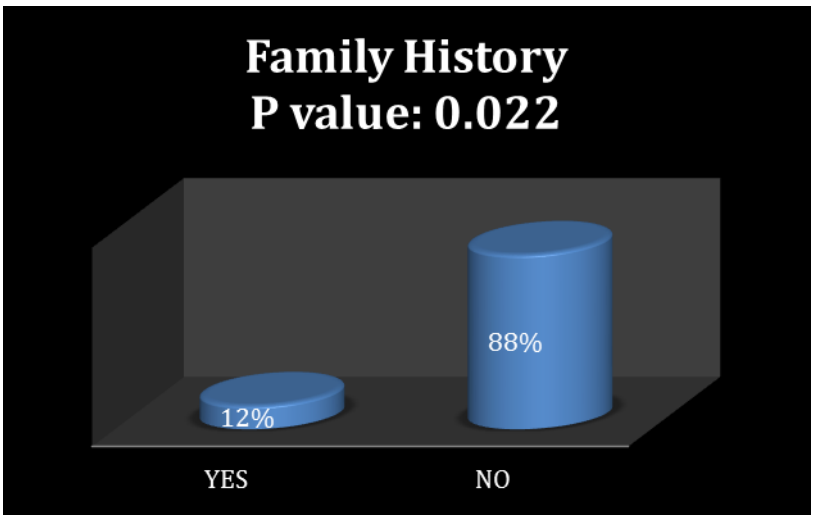

Figure 2: Family History of Color Blindness.

Table 2: Male vs. Female Comparison Regarding Family History of Color Blindness.

		'Family history'		Total
		Yes	No	
Gender	Male	18(13%)	124	142
	Female	35(24%)	114	149
Total		53	238	291

P value: 0.022.

Table 3: Image Detection Comparison by Males and Females.

		'8' Image detection				Total
		3	8	2	Nothing	
Gender	Male	4	137	0	1	142
	Female	1	146	1	1	149
Total		5	283	1	2	291

Accuracy of image detection in males: 96%

Accuracy of image detection in females: 98%

P value: 0.42

Table 4: Image Detection Comparison by Males and Females.

		'57' image detection			Total
		57	87	Red spots	
Gender	Male	139	1	2	142
	Female	149	0	0	149
Total		288	1	2	291

Accuracy of image detection in males: 97%

Accuracy of image detection in females: 100%

P value: 0.204

Table 5: Image Detection Comparison by Males and Females.

		'74' image detection				Total
		21	74	24	Green spots	
Gender	Male	1	134	5	2	142
	Female	0	145	3	1	149
Total		1	279	8	3	291

Accuracy of image detection in males: 94%

Accuracy of image detection in females: 98%

P value: 0.22

Table 6: Image Detection Comparison by Males and Females.

		'Red Orange spots' detection				Total
		Blue green spots	Red orange spots	Blue spots	Nothing	
Gender	Male	32	81	5	24	142
	Female	16	113	1	19	149
Total		48	194	6	43	291

Accuracy of correct color detection in males: 57%

Accuracy of correct color detection in females: 76%

P value: 0.033

Table 7: Image Detection Comparison by Males and Females.

		'Blue green yellow' spots detection				Total
		Blue green yellow spots	Blue green spots	violet spots	Nothing	
Gender	Male	62	28	11	41	142
	Female	69	26	10	44	149
Total		131	54	21	85	291

Accuracy of correct color detection in males: 43%

Accuracy of correct color detection in females: 47%

P value: 0.35

CONCLUSIONS

- Males had more inaccurate detections of color images, specially the numbers written in different colors. Prevalence of color blindness in males was found to be 5%.
- Females had almost none inaccuracies when asked about various numbers written in different colors. Prevalence of color blindness in females was found to be 1%.
- Type of color blindness was not identified as some of the participants mistakenly spotted the background color instead of the highlighted color. This will be determined when the participants are informed which part of the picture is to be identified.

DISCUSSION

Color blindness is a male dominant disorder, which has been clearly indicated in the above mentioned results. Majority of the male participants incorrectly identified the images, whereas the female participants had no difficulty to spot the correct images.

The findings of this study were compared to the previous studies done in different countries.

Country of Study	Male Prevalence	Female Prevalence
Our study	5%	1%
Saudi Arabia	5.85%	0.75%
India	5%	0.00%
Iran	8.18%	0.43%
Iraq	8.19%	3.20%
Pakistan	10%	1.60%

There are various limitations to this study. Firstly, the participants got confused which color to identify and many of them did not provide with the correct response.

Secondly, questions related to any problem faced during clinical procedures were not included in the questionnaire. These limitations might be tackled in future when we will continue this research in our internship.

ACKNOWLEDGEMENT

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