PERINATAL JOURNAL

Original Article

Perinatal Journal 2025; 33(2):250-256

https://doi.org/10.57239/prn.25.03320028

The prevalence of color blindness in Erbil polytechnic university students

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Abstract

In the present study, color blindness in Erbil Polytechnic University, Erbil Medical Technical Health Institute students were investigated. Of the total number of students at this institution, 1,236, all of whom were examined, 466 were male and 770 were female. Out of all 26 (2.10%) were color blindness. Among them, 23 cases (1.85%) were males and 3 cases (0.24%) were females. Their age ranged from 17 to 56 years; the older age group was related to students who study at the university in the evenings. In this study, Ichihara test was used. Color vision was tested using Ichihara color. Out of 466 males' students, 23 (4.93%) were color blindness, of which 12 were deuteranomaly and 1 was protanomaly. 3 of them were deuteranopia and 7 were complete color blindness. Out of 770 females' students, 3 (0.39%) were color blindness. There is 1 case of protanomaly, 1 case of deutanomaly l malformation, and 1 case of protanopia.

Keywords: Ishiharah chart, Deutanomaly, Deutanopia, Protanomaly, Protanopia, Total color blind

1.Introduction

Color vision deficiency (CVD) or color blindness, is the inability or decreased ability to distinguish different colors under normal lighting conditions[1]. It is one of the commonest disorders of vision[2] most of color blind cases remain undetected due to absence of proper screening[3]. The incidence of color blindness varies from race to race and in different geographical area. John Dalton was the first scientist to give a clear description of his own affliction of blindness in 1798[4]. color blindness ,also known color vision deficiency, is the inability or decreased ability to distinguish different colors under normal lighten condition[5]. The typical human retina contains two kinds of light cells. the rod cells active in low light and the cone cells active in normal daylight. Normally there are three kinds of cone cells, each containing a different pigment. each sensitive to either red, blue or green wavelength of light. Therefore we have red, green and blue cones[6]. This condition results from an absence of color sensitive pigment in the cone cell of the retina, the nerve layer at the back of the eye. human color vision is normally trichromatic in the sense that a suitable mixture of red, green, and blue lights can match any color that we can see. color vision deficiency may be congenital or acquired. Congenital color defect are non-pathologic ,incurable ,and constant throughout life[7]. it is the commonest X-Linked recessive disorder and affect as many as %8 of males and %0.5 of females[8]. There are also different cause of acquired color vision detect such as (neurological disease, some metabolic disorders , drug toxicity)[9, 10]. Red-Green defects (Protan and Deutan) show the highest prevalence in the general population. Classification of the color vision deficiency Protanomaly red weakness Deuteranomaly green weakness tritanomaly blue weakness Protanopia red deficiency Deuteranopia green deficiency tritanopia blue deficiency Achromatopsia absolute color blindness[4] a person with color blindness has trouble seeing red, green, blue or mixture of color simple tasks such as selecting ripe fruit, choosing clothing , and reading traffic lights can be more challenging , employment purpose such as pilots, in defense service and in technical fields like engineering and medical profession[11,31]. Colour vision deficiency does not cause complete blindness and there is no available therapeutics that can treat CVD[12].There is generally no treatment to cure color deficiencies. The American Optometric Association reports a contact lens on one eye can increase the ability to differentiate between colors, though

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nothing can make you truly see the deficient color[13]. Those who have CVD will be better able to adapt and make more informed career choices, if they know about their color vision status. However, a high proportion of school children are unaware of their color vision status and undiagnosed CVD could pose a handicap to the scholarly performance of an affected student[14]. Objective of study: (Aims) The present study had been conducted to find out the incidence of color blindness difference of it among the Erbil Medical Technical Health Institute Students Erbil City, Erbil Polytechnic University, Kurdistan Region.

2.Materials and Methods

This study has done in all departments in Erbil Medical Technical Health Institute in both time, morning and afternoon students. This study was about the color blindness. All cases number 1236 individuals: (466) male and (770) females with age 17 to 56 years old. This study was done with help the Ichihara test. Color vision was tested by using Ichihara chart (" Ichihara type tests for color blindness " _38 plates (1999) eye care _ Ludhiana, India) Used 38 plates in order to detect red green color deficiencies. Shinobu Ishihara was a Japanese ophthalmologist who created the Ishihara color test in 1879 to detect color blindness. The test plates consist of random spot of various isochromatic density. number or wave line are represented by spots of different color. Subject were asked to seat in a room with sufficient light and read a chart keeping it 75 cm away from the eye. to give only three seconds per plate for an answer, or correctly trace the wiggly lines, and 10 seconds for the wiggly line. To pass each test you must identify the correct number. Plate number one typically the numeral (12) diagnosed to be visible by all persons, whether normal or color vision deficient.

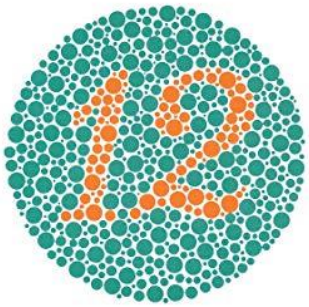

Figure (2-1) Plate number one typically the numeral (12) diagnosed to be visible by all persons

Plate number from (2 to 17) for diagnosis red _ green deficiency. Plate number from (18 to 21) with plate (26 to 38) for people that they can't read the numbers.

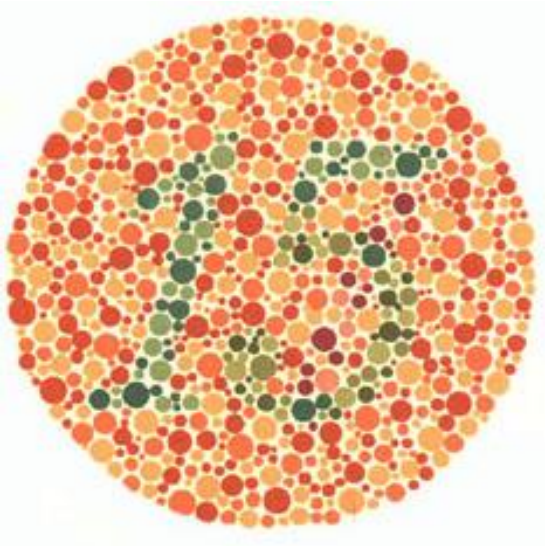

Figure (2-2): One plate of Ishihara test

Plate number from (22 to 25) for diagnosis type of color blindness (protanomaly, protanopia, deuteranomaly, deuteranopia). In the present study, prepared a questioner and fill it separately for all students. After finished this study used from the excel program for diagram and statistical analysis.

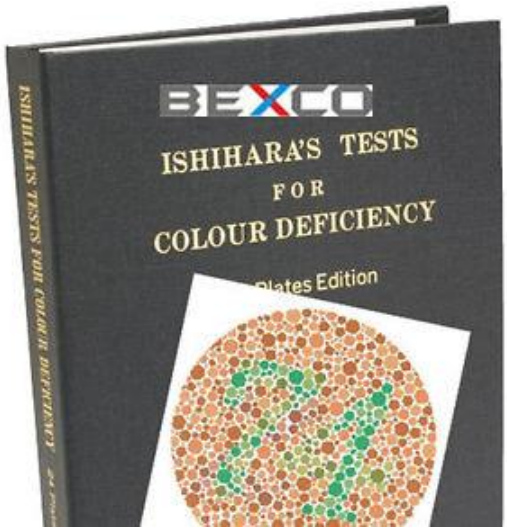

Figure (2-3) Ishihara test

Table (2-1) Table of types of color deficiency in Ishihara test

Number of Plate	Normal Person	Person with Red-Green Deficiencies				Person with Total Color Blindness and Weakness
1	12	12				12
2	8	3				×
3	6	5				×
4	29	70				×
5	57	35				×
6	5	2				×
7	3	5				×
8	15	17				×
9	74	21				×
10	2	×				×
11	6	×				×
12	97	×				×
13	45	×				×
14	5	×				×
15	7	×				×
16	16	×				×
17	73	×				×
18	×	5				×
19	×	2				×
20	×	45				×
21	×	73				×
		Prctan		Deutan		
		Strong	Mild	Strong	Mild	
22	26	6	(2)6	2	2(6)	
23	42	2	(4)2	4	4(2)	
24	35	5	(3)5	3	3(5)	
25	96	6	(9)6	9	9(6)	

3.Results

Among the 1236 cases examined in this study, we observed a prevalence of color blindness in 26 individuals (2.10%).

3.1 Gender

In the present study, examine 1236 cases that between them 770 (62.29%) cases were female and 466 (37.70%) cases were male. According to these result the relation between these genders, females more than males. The selection was done randomly, but of all the students in this educational institution, the number of females was greater than that of males.

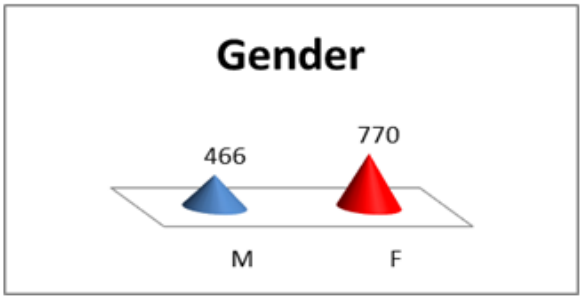

Figure (3-1) Gender: F& M

3.2 Age groups

Age: The cases age was between 17 until 56 years old. According to the results number cases with age group 17-21 were 1081cases and number cases with 22-26 years were 88, number cases with 27-31 years were

35, number cases with 32-36 year were 12 cases, number cases with 37-41 years were 7, number cases with 42-46 years were 5, number cases with 47-51 years were 6 cases and number cases with 52-56 year were 2 cases. According to these results the most or biggest number age group were 17-21 years old with 1081 cases and the least age group were 52-56 years old with 2 cases. It is worth noting that this educational institution had both morning and afternoon shifts, and in this study, all students from both shifts were examined. The age difference is due to the afternoon shift, which includes older students.

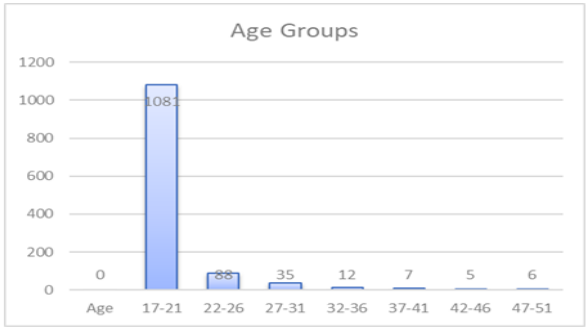

Figure (3-2) Age group

3.3 Prevalence of color blindness

Cases with color blindness: In the present study, according to the following image, from 1236 cases, cases that randomly selected in the present study, 26 (2.10%) cases had color blindness. This number is the prevalence of color blindness and color vision deficiency among males and females of both genders.

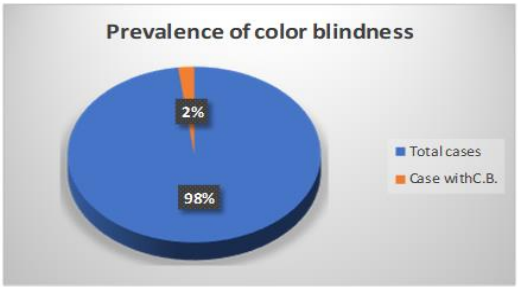

Figure (3-3) Prevalence of color blindness

3.4 Types of color blindness

From the all cases that had color blindness, 13 (1.05%) cases had deutanomaly, 7 (0.56%) cases had total color blindness, 3 (0.24%) cases had deuteranopia, 2 (0.16%) cases had protanomaly and 1 (0.09%) case had protanopia. Deuteranomaly is more common than all other types of color blindness and color deficiency, and according to the results of this study, protanopia has the lowest percentage of color blindness

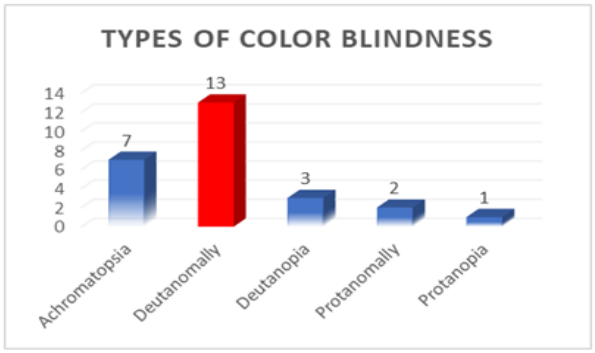

Figure (3-4) Types of color blindness

3.5 Distribution of color blindness according to their age

According to the following image, showed from 1236 cases that examined, 23 cases had color blindness that their age were age groups 17-21 years old and the other age showed in the following figure. Based on the results obtained, out of all the students examined in this study, 23 were in the age group between 17 and 21 years old, and in the age groups of 22-26, 27-31, and 32-36, only one student each had color vision problems. There were no color vision problems in the other groups. If we look closely, the number of students in the other groups were small, and the chance of color blindness in these groups with a small number of students is shown to be equally small.

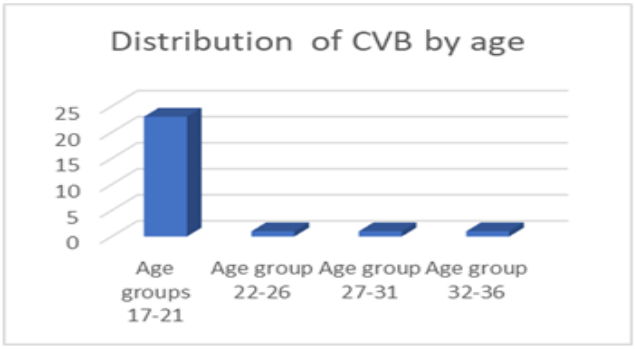

Figure (3-5) Distribution of color blindness according to their age

3.6 Distribution of color blindness in females

According to the result that showed in the following image from all the cases 770 cases (62.29%) that were female 3 cases had color blindness that they were three 1 case for protanomaly, deutanollay and protanopia. Based on the results obtained, the prevalence of color vision insufficiency and color blindness was only (0.24%) in females, which is a low percentage compared to the color vision insufficiency and blindness seen in this entire study (2.10%). These results indicate that the proportion of color blindness and color vision insufficiency in females is lower than in males.

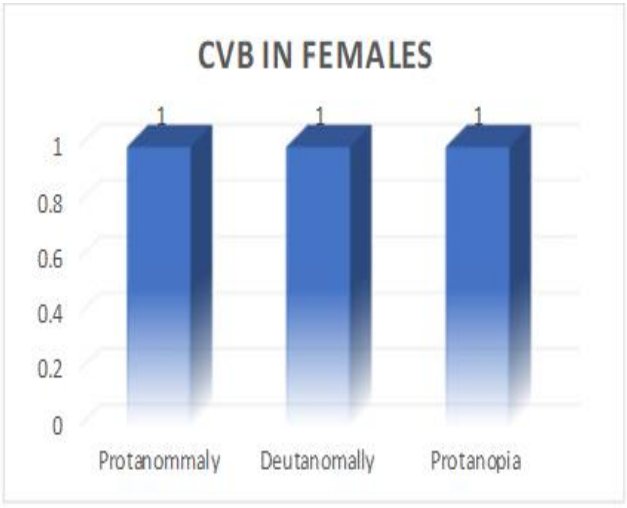

Figure (3-6) Distribution of color blindness in females

3.7 Distribution of color blindness in males

According to the result that showed in the following image from all the cases 466 cases (37.70%) that were male 23 cases had color blindness that they were 12 cases (0.97%) deuteranomaly, 7 cases (0.57%) had total color blindness, 3 (0.24%) cases had deuteranopia, and 1 case) 0.08%) had protanomaly. Based on the results obtained, the prevalence of color vision insufficiency and color blindness was observed in men (1.86%), which is a large proportion compared to the color vision insufficiency and blindness seen in this entire study (2.10%). These results indicate that the proportion of color blindness and color vision insufficiency, although the number of men and women is not equal, men are 8 times more likely than women to have color vision problems in this study.

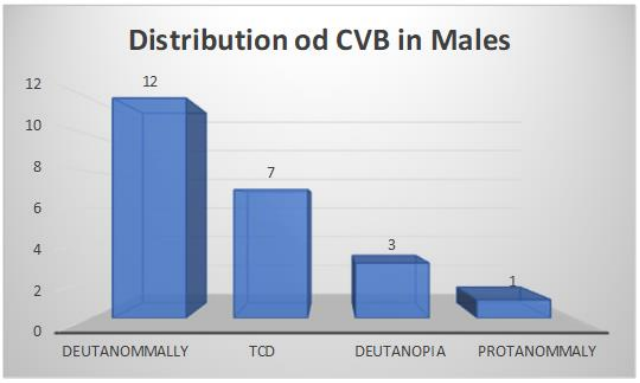

Figure (3-7) Distribution of color blindness in males

4.Discussion

In the present study, according to the following image, from 1236 cases, cases that randomly selected in the present study, 26 (2.10%) cases had color blindness .The percentage distributions of color blindness in different countries : in our finding the prevalence of color blindness among of boy (4.93 %) were found to be similar recorded in Singapore , 4.8% [15] Kalla, [16] reported an incidence of 4.6% in Muslims and Mahajan. Ethiopia 4.2%[17]. but less than the European whites, 8.0% [18]. America, 8.0% [19]. Tehran, 8.2% [20]. Korea, 5.9% [21]. however , the prevalence of color blindness (boys) in our present study in higher than India, 2.3% [9]. in Japan, 3.6%,[22]. china 3.7% [23]. and American Negro, 3.7% [24]. In the present study the prevalence of color blindness among female students (0.39%) were found to be similar recorded in Mahajan, 0.38% [25]. in korea 0.4% [21]. and 0.4%[20] in Tehran. but less than the Banasal , 1.13%[26]. Saudi Arabia , 0.75% [27]. Aligarh and Simla 0.8% [28].The prevalence of color blindness (female) in our present study in higher than Duua and Kumar[29], Bhasin[30], and Tiwari, [4] reported an incidence of 0.0% in females . In Jat Sikhs, 0.13%[4,32]. Based on the results obtained, if we compare studies conducted in other countries and this study conducted in Iraqi Kurdistan, it shows that the prevalence of color blindness and color vision impairment in this study is lower than similar studies in some countries and higher than in other countries. In any case, what is important is that color blindness and color vision deficiency are one of the problems seen in society and in many cases play a significant role in the employment of individuals. One of the important points is that many people who have color vision deficiency or color blindness do not

even know it, and it may cause many problems at work and in life. That is why it is very important that screening examinations be carried out for all schools and universities.

5.Conclusion

Color blindness is a common congenital disorder affecting general population. Many of the student were unaware of this disorder. Screening of students for color blindness is a highly effective strategy in detecting these conditions. This must be followed by affordable services and universities health programs. The prevalence of color blindness is 2.10 % in this study. Deuteranomaly has higher prevalence than others types. Males have a high risk for color blindness. The male students suffer from the congenital color blind. Proper counselling should be given to those with congenital color vision deficiency along with the parents regarding problems they can encounter in their daily activities, future jobs, genetic inheritance to their off spring, so that it could benefit them in their career guidance.

6.References

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