

Prevalence of Vision Defects among college of science Students

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Abstract

In this work; vision defects for physics and biology students for male and female in Salahaddin University in Hawler city investigated practically. For this purpose, a group of students both male and female the age range was 17 - 25 years were recruited from the first and fourth stages of physics and biology department. Participants were screened with Snellen's E chart to determine visual acuity, astigmatism chart test to identifying astigmatism condition and Ishihra plates to identifying colorblindness. Result shows the overall prevalence of vision defects in all stages was 25.7 %. This percentage is divided on the first and fourth stages of each physics and biology department. The vision defects were more common 30.49 % in fourth stage of physics department as compared to all others stages. The Commonest vision defects among the students was *hyperopia* and *myopia* (47.56 %), followed by astigmatism (26.83%) and colorblindness by 25.61%. Female were having relatively more vision defects compared to male expect colorblindness was more common in male than females. The aim of the study is to evaluate vision defect in physics and biology students. Statistical analyses were performed using the Statistical

Package for Social Science (SPSS) version (25)

Key Words: Vision defect, Myopia, Hyperopia, Astigmatism, Colorblindness.

Introduction:

The most important organ in Human body is called eye, the eye is a part of human body which it is a great roll in human life, the vision defects nowadays is the one of the inherent problems in Kurdistan. Vision defects generally include the colorblindness and Refractive errors (Myopia (MY), Hyperopia (HY) and Astigmatism), the fourth most important Cause of blindness by WHO definition was refractive error [1]

Prevalence data useful in searching etiologic mechanisms [2] Myopia increased with increasing education and hyperopia declined with increasing year of education. [3]

Myopia, is the most common human eye in the world, and its significant global public health concern [4] The back of retina is consisting of two types of receptor cells, known as rods and cones. There are about 100 million of rods in the retina. The Rods are sensitive to dim light and do not respond to color. Cones (located closer to the fovea) are sensitive to bright light and color. [5,6]

Vision defect

Eye defects are a phenomenon that many people deal with daily. In some cases, the defects of the eye are present from birth. Other types of eye defects are developed later in life. There are several eye conditions that are far more common than others. Fortunately, many of these common eye defects can be treated effectively.

A-Myopia

Myopia or nearsightedness, is the most important causes of visual impairment worldwide (7-13). Severe or high-grade myopia is leading cause of blindness because of associated ocular comorbidities of retinal detachment, macular choroidal degeneration, and glaucoma (13).

B-Hyperopia

Light ray from an object at infinity are focused behind the retina in Hyperopia. Hyperopia, or farsightedness, is a common vision problem, it is difficult to make conclusion since most of studies conducted on the elderly and the high prevalence of hyperopia is a normal due to lens changes [8]

C-Astigmatism

In astigmatism the light rays do not focus at a single point because of variations in the curvature of the cornea or lens at different meridians. Astigmatism is a type of refractive error [9]

D-Colorblindness

An understanding of the causes of bindless and the magnitude of the problem is crucial in designing effective intervention and prevention program [10]

Material and Methods

In this research, the materials are used including the following Tests such as; Snellen Eye Chart, Astigmatism chart test, Ishihara color blindness test.

A-Snellen Eye Chart

Snell's chart is used to provide a baseline recording of visual acuity and diagnosis of eye disease or refractive error. [11]

Figure 1: Snellen eye chart



B- Astigmatism chart

Astigmatism chart are used to determine the degree of blurring, figure-1 shows this test.

Figure 2: Astigmatism (or degree of eye blurring) chart.

C-Ishihara color blindness test

color vision is provided by three types of photoreceptors; sensitive to blue, green and red wavelength of visible spectrum which. shown in figure-2

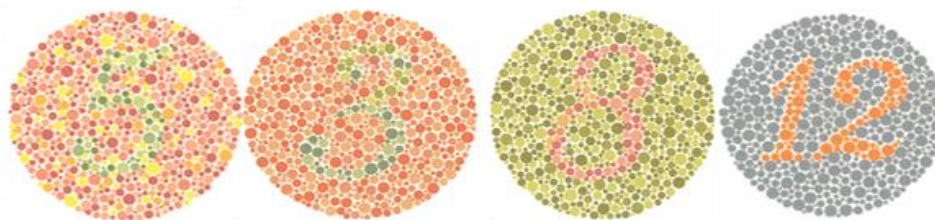
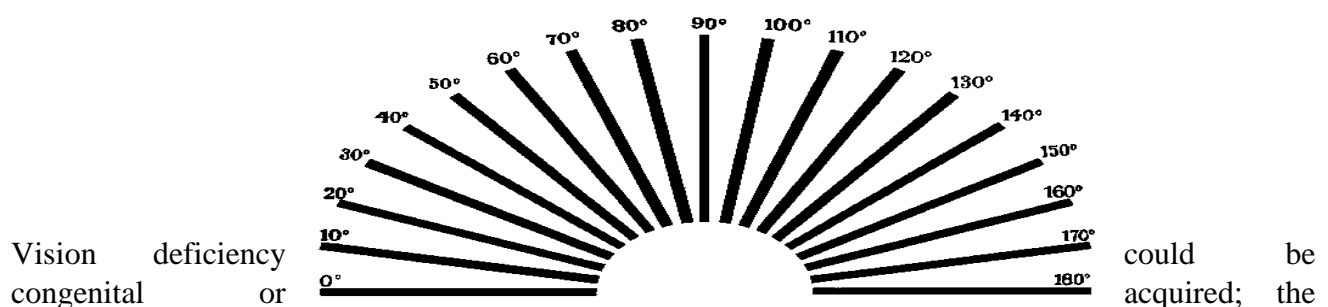


Figure 3: Ishihara color plates used to determine colorblindness defect in patient



acquired form reflects a problem that occurred anywhere along the visual pathway from the photoreceptors to the cortex. [12]

Method of procedure

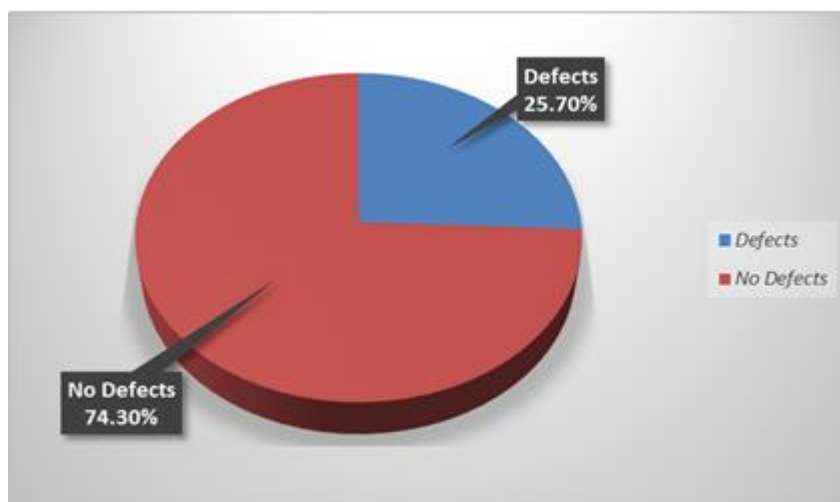
The methodology for this study is composed of different examinations and computerized techniques for the means of diagnostic the vision defects in student's eye. All tests are performed at a specific hall in the College of Science in Hawler city by using standard charts, computer and data show system. Each patient underwent three different tests for determine Astigmatism, colorblindness and HY and MY.

The VA for recruits was tested by using a standard eye test chart called Snellen eye chart which it put (Patient is seated at the distance of 3 meters from Snellen's chart) in a distance of three meter from the participants., first with one eye opened by close other one and repeated the same steps for test both eyes.

To test the color blindness of participated we use date show system and computer. By using Ishihara Color Test which used to diagnose red green color blindness in patients. The number of plates is shown on the computer monitor, recruits began to recognize the numbers are embedded on plates if the patients cannot recognize the numbers on the plates or read a number instead of the origin number (confusing the numbers) means he has a colorblindness.

The Astigmatism testing was performed as follows:

Astigmatism chart test was used for determine astigmatism condition in students. Students first with one eye focusing on the center of the astigmatism chart on the computer monitor if they see blurred chart it mean they have astigmatism condition.



Result and Discussion

A total of 160 (360 eyes) students of both departments of physics and biology were examined There were found 82 eyes of male and female gender participants which is corresponds to 25.7% As shown in the fig (4).

Figure 4: Prevalence of vision defects for physics and biology students.

It was observed that the overall vision defects in Science College was 25.7 %. The vision defects were more common (30.49 %) in fourth stage of physics department as compared to all others stages of biology and physics departments as shown in the in figure (5).

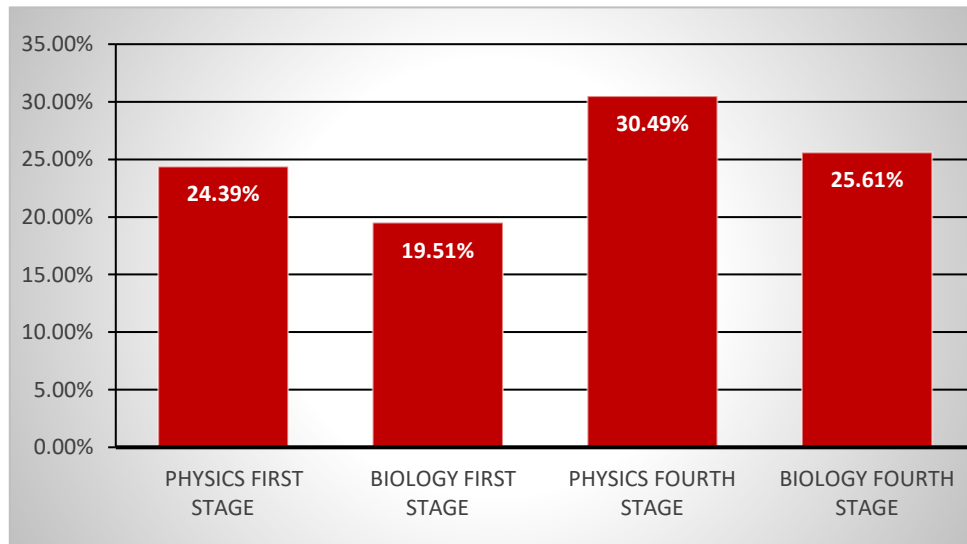
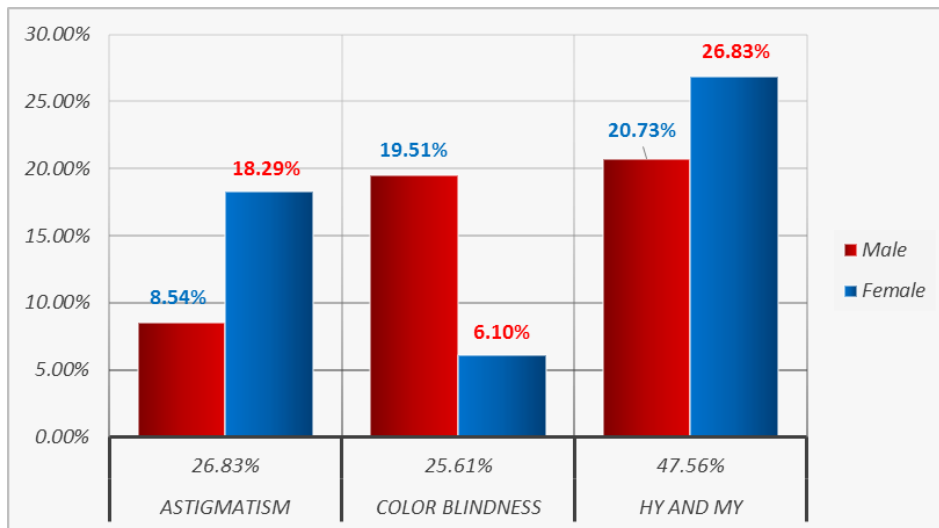


Figure 5 1: Vision Defects prevalence of the first and Fourth stages of physics and biology departments in Science College.

Figure (5) show the distributions of vision defects according to first stage and fourth stage of each physics and biology department, this figure illustrate that the fourth stage of physics has higher rate of vision defects than all three stages and then fourth stage of biology followed by the fourth stage of physics.

Figure 6: prevalence rate of vision defects by Types of defects (Astigmatism, Color blindness and HY AND MY).



From the figure (6), the *HY and MY* was the most prevalent vision defects at 47.56 % (39 cases) followed by Astigmatism 26.83% (22 case) and colorblindness at 25.61% (21 cases).

Figure 72: Show the difference of the type defects between male and female. **Table 1: Vision Defects prevalence by Gender**

Defects	Cases	Male	%	Female	%
Astigmatism	22	7	8.54%	15	18.29%
Colorblindness	21	16	19.51%	5	6.10%
Hyperopia	39	17	20.73%	22	26.83%

A. Vision defects for Physics first and fourth stage

Figure 8: prevalence rate of vision defects by Types of defects (Astigmatism, Color blindness and HY AND MY) of first and fourth Stages of physics.

From figure (8) Majority of subjects were female 24.44% and 22.22% male and also colorblindness and astigmatism each of one is 26.67% meaning each one have 12 subjects such as shown in table 2.

Table 2: prevalence of Vision Defects in Physics first and fourth stages.

Defects	Cases	Male	%	Female	%
Astigmatism	12	4	8.89%	8	17.78%
Colorblindness	12	9	20.00%	3	6.67%
Hyper and Myopia	21	10	22.22%	11	24.44%

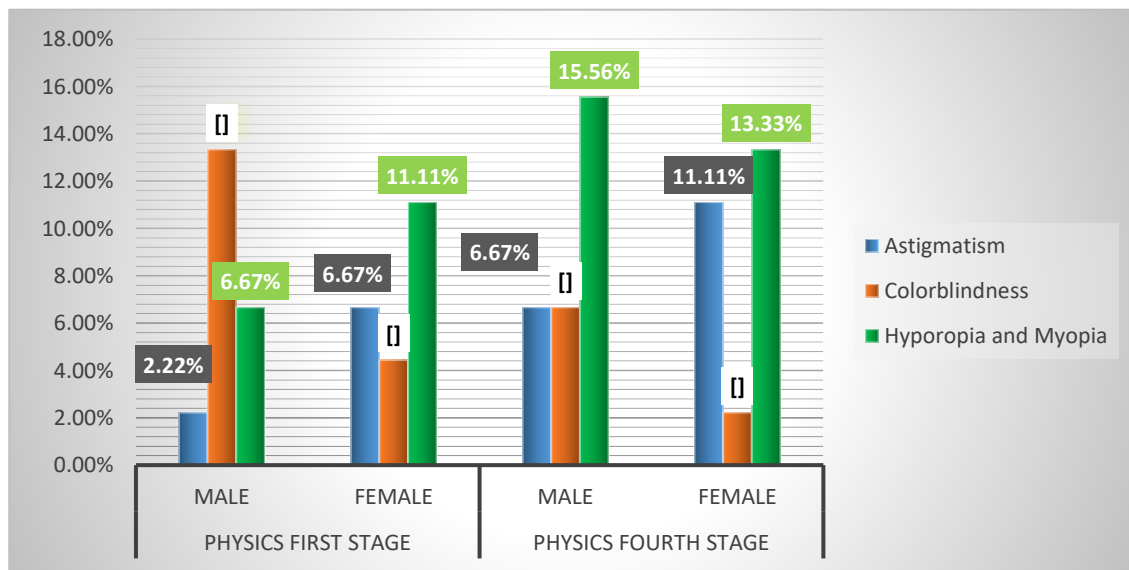


Figure (9) shows the comparison between first and fourth stages of physics dept. According to gender and vision defects types, figure (14) indicated the percentage of the astigmatism, colorblindness and HY and MY.

Figure 93: Compared the prevalence rate of vision defects between first and fourth stages of physics department by Gender.

Generally, the fourth stage of physics has a higher prevalence of refractive errors compared to the first this is due to some environmental situations and other factors. More detail of these prevalence rates is shown in table-3.

Table 3: vision defects types prevalence for first and fourth stages of physics department.

Defects	cases	Ph.1		Ph.4	
		Male %	Female%	Male%	Female%
Astigmatism	12	1 2.22%	3 6.67%	3 6.67%	5 11.11%
Colorblindness	12	6 13.33%	2 4.44%	3 6.67%	1 2.22%
Hyperopia & Myopia	21	3 6.67%	5 11.11%	7 15.56%	6 13.33%

In figure (10) Hyperopia and Myopia was more likely to be present (24.44% for female and 22.22% for male) in the students of fourth stage of Biology's for both genders compared to each colorblindness and

Astigmatism then the astigmatism is followed it by 17.78% for female and 8.89% for male and after that colorblindness by 20% for male and 6.67% for female.

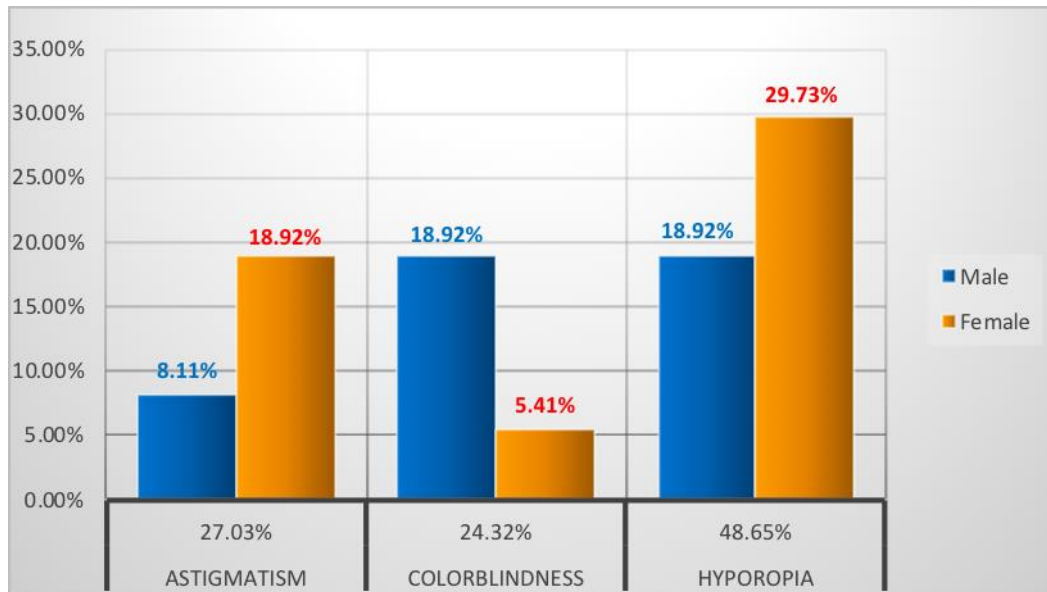


Figure10: **Biology's** first and fourth stage prevalence rate of vision defects by gender.
B. Vision defects for biology's first and fourth stages.

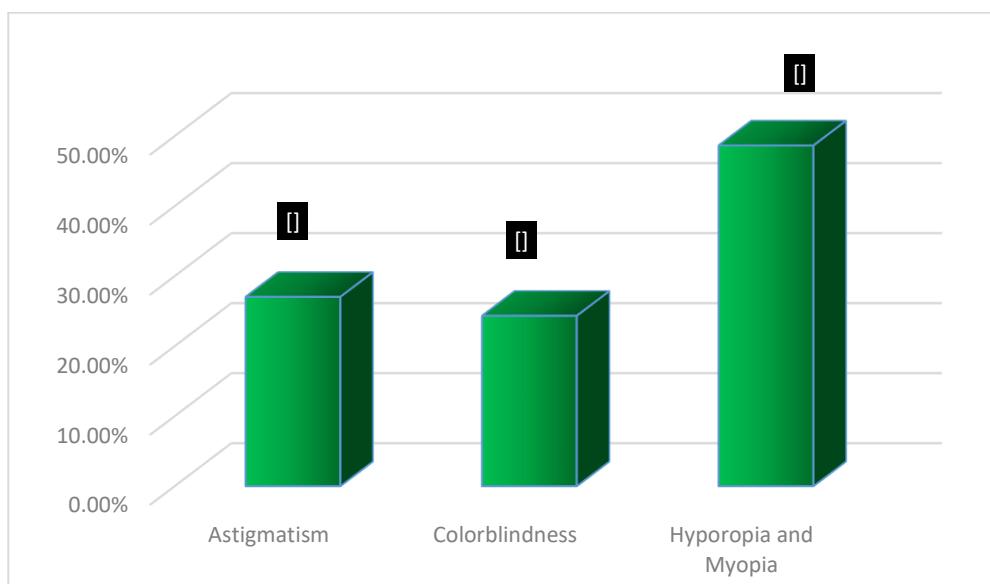


Figure 41: prevalence rate of vision defects by Types of defects (Astigmatism, Color blindness and HY AND MY) of Biology's first and fourth Stages.

The figure (11) is show the prevalence rate of vision defects of biology's first and fourth stages between 80 examined students were *Hy and My* 48.65% meaning 18 subjects. And also, colorblindness 24.32% meaning have 9 cases and astigmatism is 27.037% meaning have 10 cases such as shown in table 4.

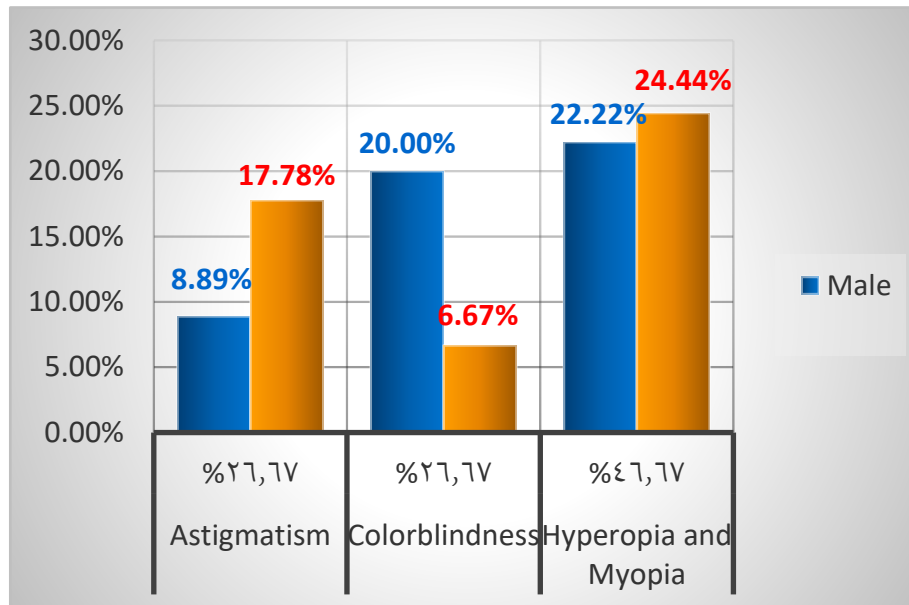


Figure 12: *physics* first and fourth stage prevalence rate of vision defects by gender.

In figure (12) Myopia and Hyperopia has a higher prevalence rate (The females had a higher (24.44%) prevalence as compared to the males by (22.22%)) in the students of fourth stage of *biology* department for both genders compared to each Colorblindness and Astigmatism then the Astigmatism is followed it by 17.78% for female and 8.89% for male and after that colorblindness by 20% for male and 6.67% for female.

Defects	Cases	Male	%	Female	%
Astigmatism	10	3	8.11%	7	18.92%
Colorblindness	9	7	18.92%	2	5.41%
Hyperopia & Myopia	18	7	18.92%	11	29.73%

Table 4: *vision defects prevalence rate for biologys first and fourth stages by gender.*

Figure (13) show vision defects prevalence rates between biology's first and fourth stages. According to gender and vision defects types, indicated the percentage of Astigmatism, colorblindness and both *HY and MY*. Generally, biology fourth stage has a higher prevalence of refractive errors compared to first stage. More detail of these prevalence rates is shown in table-6.

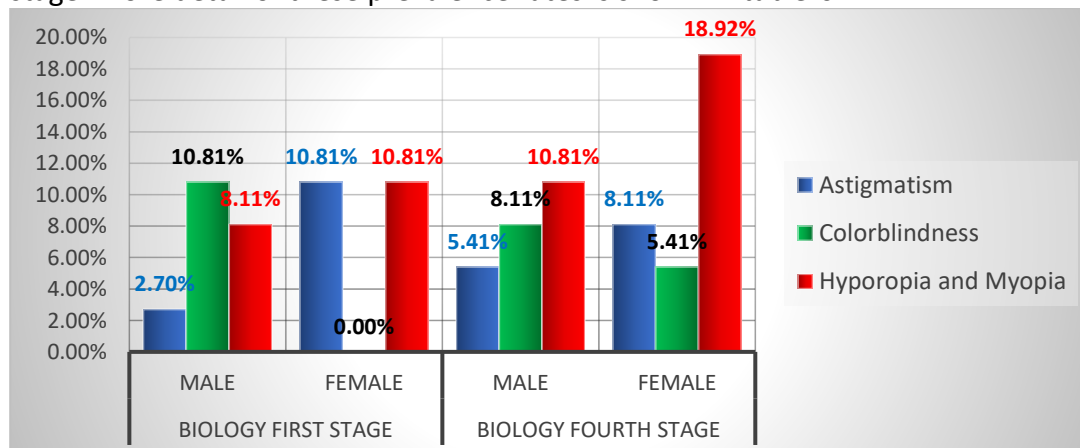


Figure 13: Compared the prevalence rate of vision defects between biology first and fourth stages of by Gender.

Table 5: vision defects types prevalence of biologys first and fourth stages according to vision defect types and gender.

Defects	Case	BIO 1				BIO 4			
		Mal	%	Femal	%	Mal	%	Femal	%
Astigmatism	10	1	2.70%	4	10.81%	2	5.41%	3	8.11%
Colorblindne	9	4	10.81%	0	0.00%	3	8.11%	2	5.41%
Hyperopia & Myopia	18	3	8.11%	4	10.81%	4	10.81%	7	18.92%

Table 6: Pvalue for Four and first stage, biology and physics students

P value	
Physics	Biology
Four stage	0.03
First stage	0.01

Table 7: Pvalue for male and female Four and first stage, for biology and physics students

P value				
	Four stage		first stage	
	Male	Female	Male	Female
Physics	0.02	0,03	0,04	0.3
Biology				

Discussion

Vision defects are one of the avoidable causes of blindness and low vision. It can restrict progress in education, limit career opportunity and restrict access to information. So, it is essential to understand the pattern of Vision defects in college students to plan effective programs to deal with the problem. Among (160 students) in the college of science were examined, it is found that there are (82 vision defects) which is corresponds to 25.7% of the examined students. This percentage is divided on the first and fourth stages of each physics and biology department. About 34% at physics fourth stage and the biology fourth stage by prevalence rate of 26% followed it and after all the first stages of each physics and biology by prevalence rate of 24% and 20% respectively. Statistical analyses were performed using the Statistical Package for Social Science (SPSS) version (25)

In table (6) there are significant differences between four and first stage biology and physics students (p value=0.01. 0.03), also in table (7) as we see also there are significant differences between male and female four and first stage, physics and biology students (p value= 0.02,0.03,0.04,0.03). so, gender was significantly difference.

If we looked at these results which mentioned above, see that the physics fourth stage significantly had a higher ratio of vision defects than the all other stages of physics and biology. The physics department is completely different from the biology department according to their contents if we check up the physics subjects mostly are consisting of the mathematical operations and formulas while the biology comprehension and reading are dominants. For that reasons tried to discuss the higher prevalence of vision defects in physics fourth stage compared to others stages. physics fourth stage is statistically

divided by each of the defects types and gender of recruited students, In the present study, 37% for *HY and MY* meaning have 12 cases, Astigmatism by 30% (10 cases) and colorblindness by 28% (8 cases) that's mean that the prevalence of vision defect is high among students and that's agreed with Moheen Mansumali et al study say that prevalence of vision defect among student (myopia, hypermetropia, colorblindness and astigmatism were 61(35.5), 24(12.0) 6(3.0) and 67(33.5) is also high. In colorblindness our study result disagrees with the above study.

The above results show that *HY and MY* have significantly a higher rate than the others defects. This is may include the following factors: Study all knows that reading precisely effects on the eyes vision and caused to the vision defects. Another factor that is affected on the human vision is sleeping time (bedtime), bedtime is the important topic should be considered because has a bad role and cause to the vision defects. In this research project that is illustrates for us the bedtime effects on the vision by observing that whose sleep at the late time about 1-3 am have more refractive errors than that are sleep at 10-12 pm. And also, less sleep mainly has a terrible role on the vision, in research project it found that those who have less sleep about 5-6 hours per a complete day (24 h) Have higher vision defects than those who sleep about 7-8 hours or less more. The family history is another factor should not be neglected in this research project.

Astigmatism defect are also more common in fourth stage of physics this is regarded to the more reading and that factors mentioned above. But the colorblindness this factor is less affect it is mostly occurred by family history. If we classified the defects ratios by gender see that the males have lower defects than the females in each HY and MY and astigmatism this is due to the fact that females busier to reading and get enough sleep than to males but colorblindness is approximately similar to the worldwide prevalence by 37% for males and 5% for females.

After fourth stage of physics the biology fourth stage is come in defects, the prevalence of *HY and MY* more common compared to each astigmatism and colorblindness by 48.65%, Astigmatism by 27.03% meaning have 10 defects and 24.32% colorblindness by 9 cases. This is also due to the factors mentioned above and the risk of defects is increases by age group.

As our study was limited to data from 160 students it may not be possible to generalize the results to the whole Kurdistan population.

Conclusion

A vision defect prevalence evaluated in physics students are more effective as compared to biology students. the physics students have a significantly higher prevalence of refractive error as compared to biology and prevalence rate of *HY and MY* was significantly more in females in both departments compared to females but colorblindness was significantly higher prevalence in males than females students.

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