

# A Study to Assess the Knowledge, Attitude and Practice on Digital Eye Strain Prevention and Awareness among Undergraduate Medical Students in a Tertiary Care Hospital in Chennai, Tamil Nadu

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**Received:** 01-11-2022,

Manuscript No. AMHSR-22-81649;

**Editor assigned:** 03-11-2022,

Pre QC No. AMHSR-22-81649 (PQ);

**Reviewed:** 17-11-2022,

QC No. AMHSR-22-81649(Q);

**Revision:** 24-11-2022,

Manuscript No: AMHSR-22-81649(R);

**Published:** 01-12-2022

DOI: 10.54608.annalsmedical.2022.81

## Abstract

The pandemic has made long distance learning a necessary intervention and has had students glued to their screens for hours on end. Computer Vision Syndrome (CVS)' defined by The American Optometric Association. Blue light, emitted from manmade sources like LED screens, is believed to be one of the leading causes of digital eye strain. Eye strain is often associated with symptoms such as eye fatigue, eye strain, pain in and around the eye, blurred vision, headaches and even diplopia (double vision). Asthenopia and dry eye are the core symptoms of CVS. Adding to this is the adoption of bad posture and usage of procrustean furniture. So we have taken 200 medical college students randomly in that 113 females and 87 males out of this 200 students 42% had visual problems diagnosed before 2020, Before covid 58% of the students had no visual problems and only 42% had problems with vision. Among the 42% myopia and astigmatism contributed to the maximum of 8 percentage and hypermetropia contributing to the least that was 1% percentage. Against this the present scenario was a striking increase by 125.3 % with 55% needed visual correction. The study also brings you to the attention that many needed the change of lens in the pandemic and it was more than 25% of spectacle using population. Before the pandemic, 39 students (20%) spent more than 6h with their screens, which is a stark contrast to 178 students (90%) who spent more than 6h on their screens during the pandemic. The data clearly shows a gross increase in the average screen time after the pandemic, almost doubling in duration. The most frequent symptom associated with screen time was found to be headache (29 people claimed they always developed headaches, while 57 people claimed to develop headaches occasionally), followed by tearing of eye (12 people claimed they always developed tearing, while 91 people claimed to develop tearing occasionally). The most intense symptom suffered by the participants was headache (32 responses) followed by dryness of eye (20 responses). Colored halos and diplopia was least when it comes to intensity of symptoms but could not be ignored. Our recommendation are reduction in usage of screen time and usage of blue filter, E book, Post covid eye camp mainly for students and students should be thought about the 2020 rule.

**Keywords:** Covid19, digital eye strain, visual problem, 2020 rule

## Introduction

The covid pandemic made every tissue in our body suffer without oxygen and this also included eyes. This caused the computer vision syndrome. The blue light emitted from led screens is considered to be one of the main reason why the computer vision syndrome occurred. This particularly has a very striking impact on college students because of online classes. The present study tries to document different problems associated with vision that the college students have experienced throughout the pandemic and tries to make a comparison between the pre Covid and post covid. Pink eye remains the most common sign of covid with respect to eye. With the evidence that covid can cause inflammation in the body with elevation of

d dimer levels and it creates a procoagulant state, the clot that are formed can dislodge and reach the retina and other parts of the eye which can cause the following problems include Retinal vein occlusion, retinal hemorrhage, eyestroke Etc.

## Background

The pandemic has made long distance learning a necessary

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**How to Cite this Article:** Uppili Venkat Ragavan, et al. A study to assess the Knowledge, Attitude and Practice on digital eye strain prevention and awareness among undergraduate medical students in a tertiary care hospital in Chennai, Tamil Nadu . Ann Med Health Sci Res. 2022;12:S1: 169-176.

intervention and has had students glued to their screens for hours on end. [1] Computer Vision Syndrome (CVS)' defined by The American Optometric Association as a combination of eye and vision problems associated with the use of computers, results from the individual having insufficient visual capabilities to perform the computer task comfortably.

Blue light, emitted from manmade sources like LED screens, is believed to be one of the leading causes of digital eye strain. Eye strain is often associated with symptoms such as eye fatigue, eye strain, pain in and around the eye, blurred vision, headaches and even diplopia (double vision). Asthenopia and dry eye are the core symptoms of CVS. [2] Adding to this is the adoption of bad posture and usage of procrustean furniture.

The COVID-19 pandemic has placed a spotlight on the insidious increase in the prevalence of CVS [3], with studies showing over 50% of computer and mobile screen users being affected by it. [4]

One simple and effective method advised to reduce eye strain is the 20-20-20 rule: for every 20 minutes spent looking at a screen, a person should look at something 20 feet away for 20 seconds. [5] Other methods include frequent blinking, using artificial tears, using prescription color filters on vision correction equipment, etc. [6]

With the world of education coursing towards digitalization, screens will become as inevitable in a teaching institute as chalk and board. It is only right that people learn about methods to preserve their health to the best of their ability.

Charity starts from home; for doctors to preach, they have to practice. It is important to gauge the extent of awareness about eyestrain prevention among medical students so that they can be better equipped to educate their patients regarding the same.

### Objectives/Aims

1. To assess the level of knowledge & attitude of undergraduate medical students regarding simple methods for prevention of eye strain.
2. To identify the practice of undergraduate medical students regarding the prevalence and prevention of digital eye strain.
3. To determine the correlation between the level of knowledge & practice of undergraduate medical students regarding the prevalence and prevention of digital eye strain.
4. To impart health education

### Methodology

**Study Design:** sectional – KAP

**Study Area & population:** Second and third year undergraduate medical students from GMCOGE

**Sample Size:** 200 students

**Sampling technique:** Universal sampling

**Period of Study:** Data was collected within one month after ethical clearance

**Study Tool:** Predesigned semi structured questionnaire. Data was collected after taking informed consent

**Inclusion Criteria:** 2nd and 3rd year Undergraduate medical students.

**Exclusion Criteria:**

1. Students not willing to participate in the study.
2. Students not available during the time of study.
3. First year students.

**Brief procedure:**

To assess the level of knowledge & attitude of undergraduate medical students regarding the prevention and management of digital eye strain based on the awareness regarding the symptoms and management of computer vision syndrome, a list of all the undergraduate medical students in this tertiary care hospital was procured and sample population is selected based on the inclusion and exclusion criteria. Data collection was done using a predesigned semi-structured questionnaire. The survey was concluded by instructing the medical students regarding the appropriate way to practice simple methods of eye strain prevention.

**Statistical Analysis**

Data was entered in Microsoft Excel and analyzed in SPSS. Descriptive statistics was used to describe the distribution of all variables. The statistical analysis was carried out using SPSS 16 and includes calculation of percentages and proportions.

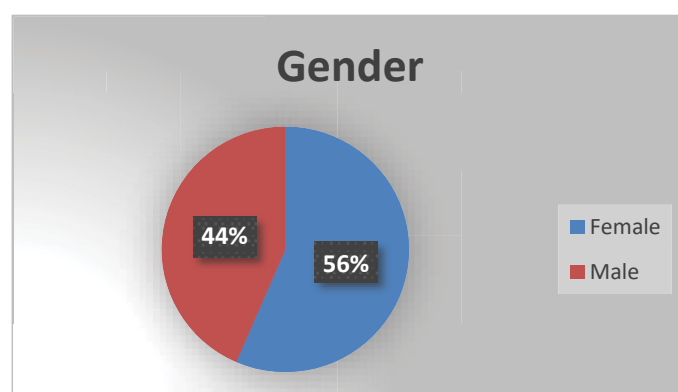
**Implications**

The integration of novel and modern learning methods that rely heavily, if not solely on computers and mobile phones is the practical way forward in medical education. This change brings with it the problems of digital eye strain and vision impairment (100). Hence, assessment of students' knowledge, attitude and practice regarding the digital eye strain prevention is necessary to identify lacunae in their awareness and rectify it.

A pre-designed questionnaire was circulated among 300 students belonging to second year and third year of MBBS at Government Medical College Omandurar Government Estate. A total of 200 usable responses were pooled together and analysed (Figures 1-3).

**Demography**

The responses consisted of 113 females and 87 males



**Figure 1:** The age range fell between 17 years to 26 years, with most participants in the age group of 19 years to 22 years.

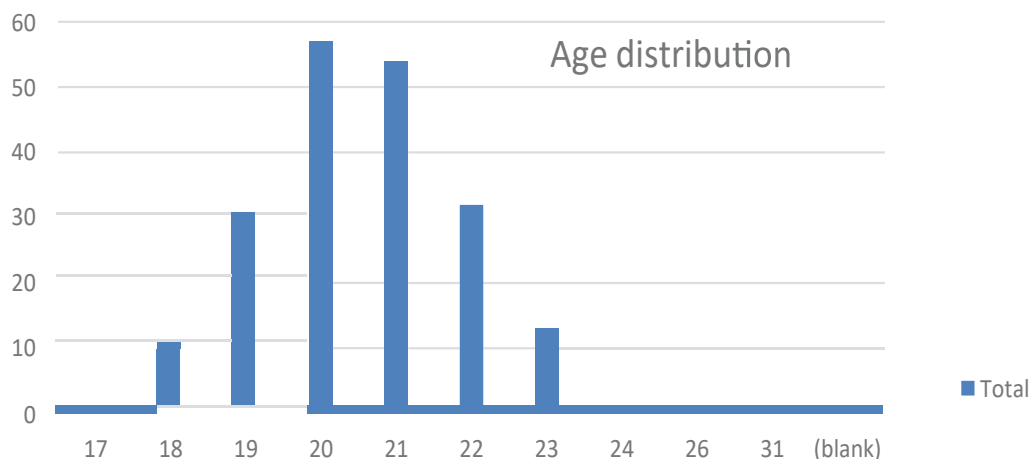


Figure 2: Age Distribution

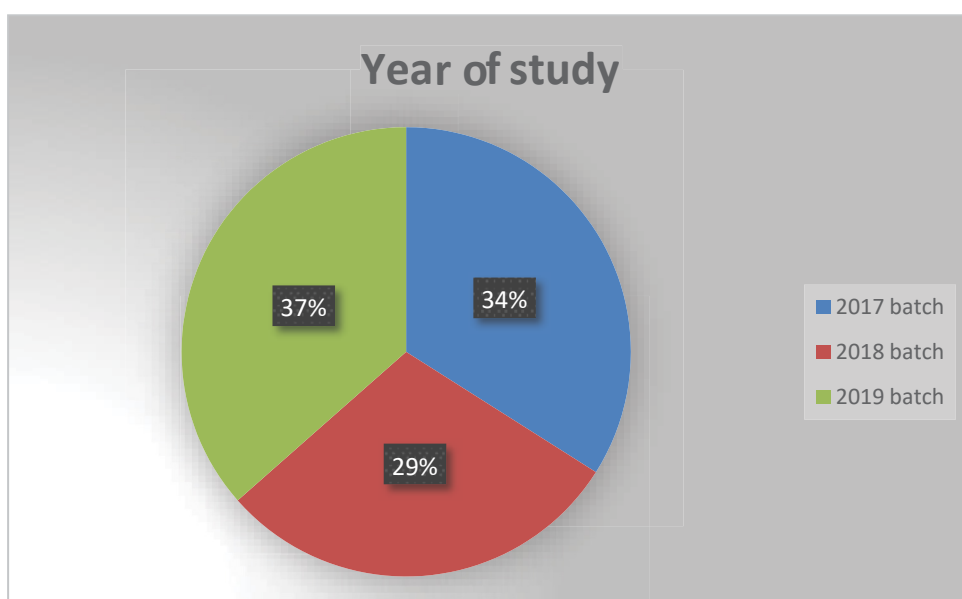


Figure 3: Of the 200 responses, 68 responses (34%) were selected from 2017 batch, 59 responses (30%) from 2018 batch and 73 responses (37%) from 2019 batch.

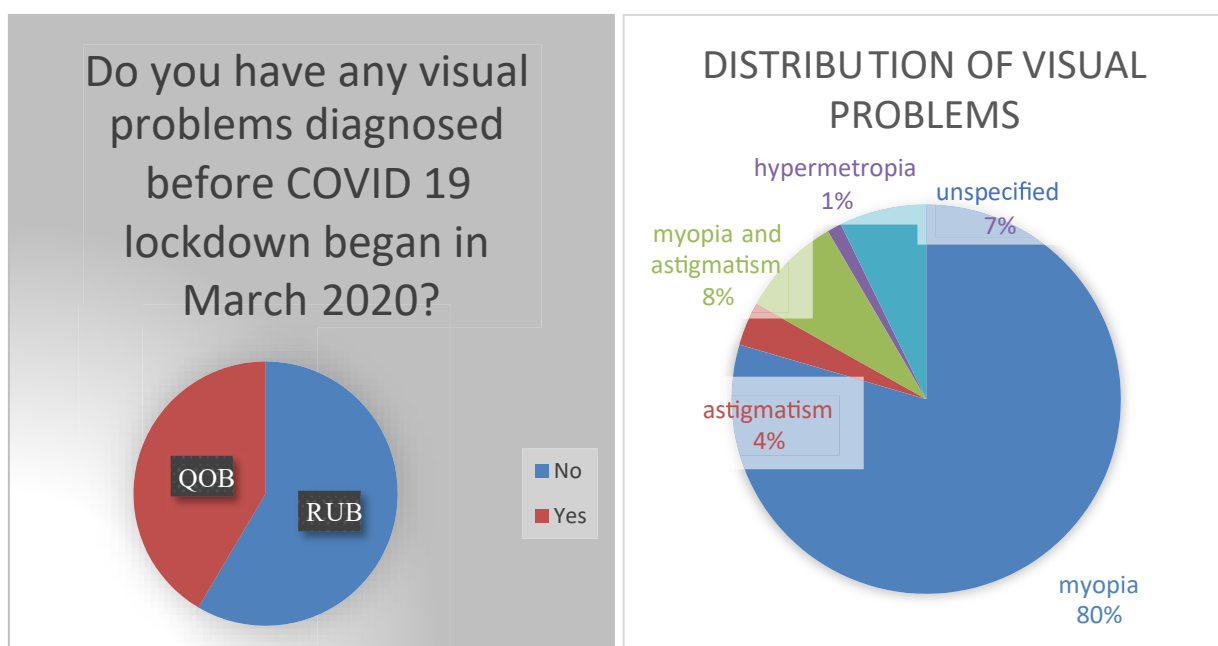


Figure 4: Visual Problems and Preventative/Curative Measures Taken before the COVID19 Pandemic

## Visual Problems and Preventative/Curative Measures Taken Before the Covid19 Pandemic

Out of the 200 responses, 83 students (42%) had visual problems diagnosed before March 2020 i.e. before COVID19 lockdown began, of which (Figure 4):

1. 66 had myopia
2. 3 had astigmatism
3. 7 had both myopia and astigmatism
4. 1 had hypermetropia
5. 6 did not specify their refractive error

Currently:

1. 104 students (52%) who responded use spectacles to correct their vision
2. 6 students (3%) use contact lenses

Of those who used vision correction equipment, 50 students claimed that they required a lens power change during the pandemic (Figure 5-9 and Table 1-2).

Others included lowering screen brightness, increasing distance between eyes and screen, dark room exercises, using anti-glare glasses, eye irrigation and closing eyes and resting (Figure 10).

Most employed preventive measure employed by the participant

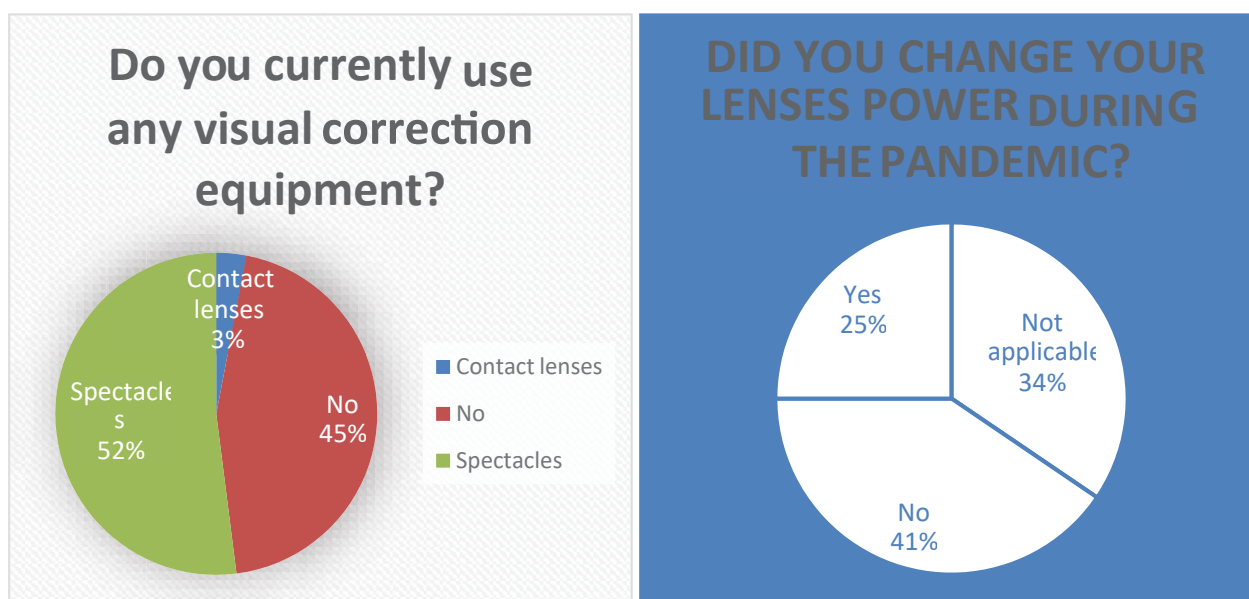


Figure 5: During Pandemic

During Pandemic

## Effect of The Pandemic on Screen Time

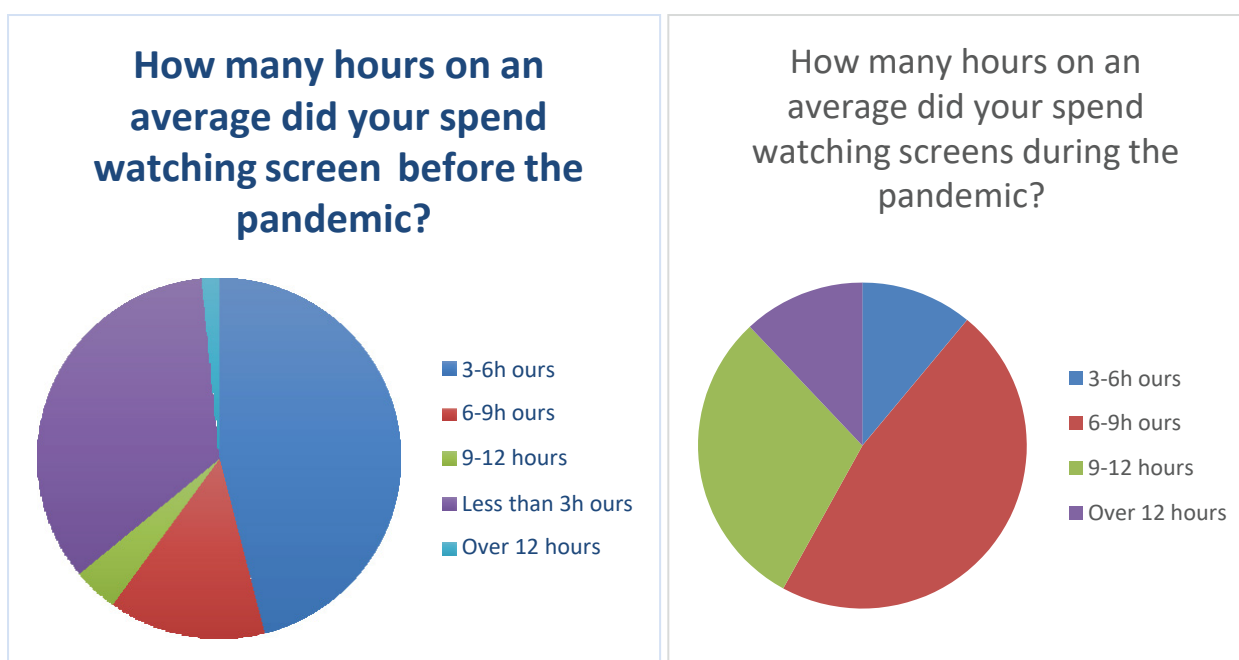
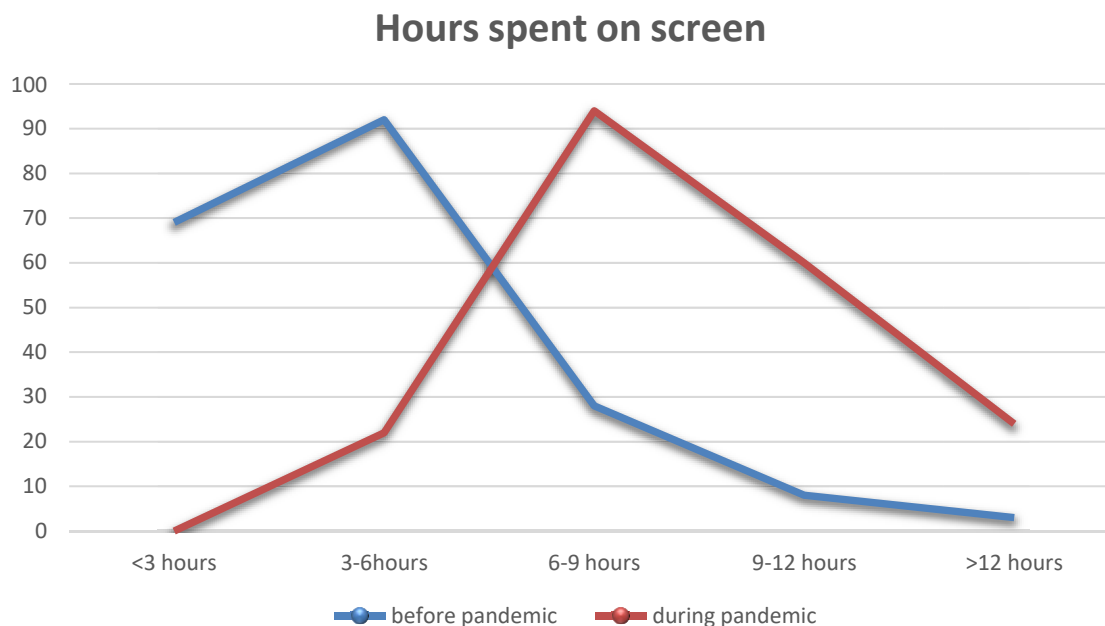


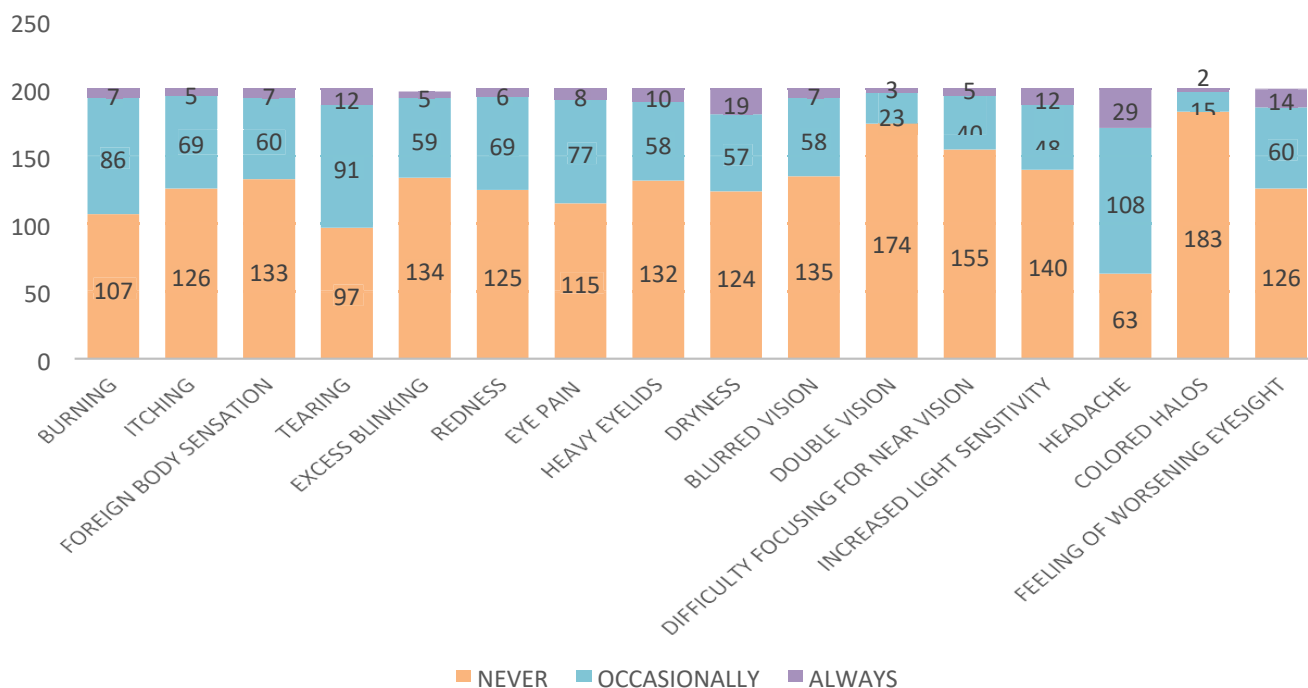
Figure 6: Effect of the Pandemic on Screen Time



**Figure 7:** Before the pandemic, 39 students spent more than 6h with their screens. 178 students spent more than 6h on their screens during the pandemic.

## CVS QUESTIONNAIRE FREQUENCY OF SYMPTOMS

### HOW OFTEN DO YOU EXPERIENCE THE FOLLOWING SYMPTOMS



**Figure 8:** Frequency of Symptoms

was periodic breaks from screen (129 responses) and usage of blue light filters (93 responses).<sup>[7-9]</sup>

Others included lowering screen brightness, increasing distance between eyes and screen, dark room exercises, using anti-glare glasses, eye irrigation and closing eyes and resting (Figure 10).

Most employed preventive measure employed by the participant was periodic breaks from screen (129 responses) usage of blue light filters (93 responses).<sup>[7-9]</sup>

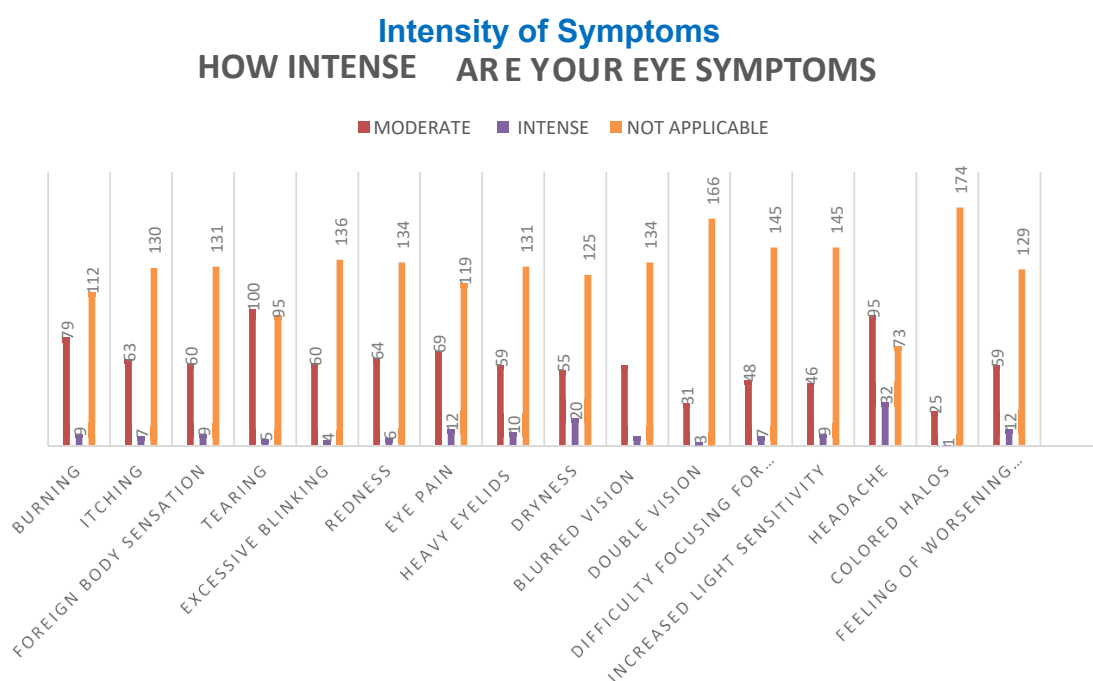
## Discussion

Of the 200 entries, only 68 are aware of the 20/20/20 rule to reduce digital eye strain – of which only 13 students follow the rule regularly (Figure 11). This highlights the lack of knowledge and lacunae in following proper practices for protection against digital eye strain.

Before covid 58% of the students had no visual problems and only 42% had problems with vision. Among the 42% myopia and astigmatism contributed to the maximum of 8 percentages

**Table 1:** 29 people claimed they always developed headaches, while 57 people claimed to develop headaches occasionally. 12 people claimed they always developed tearing, while 91 people claimed to develop tearing occasionally.

SYMPTOM	NEVER	OCCASIONALLY	ALWAYS	Total symptomatic
Burning	107	86	7	93
Itching	126	69	5	74
Foreign Body Sensation	133	60	7	67
Tearing	97	91	12	103
Excess Blinking	134	59	5	64
Redness	125	69	6	75
Eye Pain	115	77	8	85
Heavy Eyelids	132	58	10	68
Dryness	124	57	19	76
Blurred Vision	135	58	7	65
Double Vision	174	23	3	26
Difficulty Focusing For Near Vision	155	40	5	45
Increased Light Sensitivity	140	48	12	60
Headache	63	108	29	137
Colored Halos	183	15	2	17
Feeling Of Worsening Eyesight	126	60	14	74

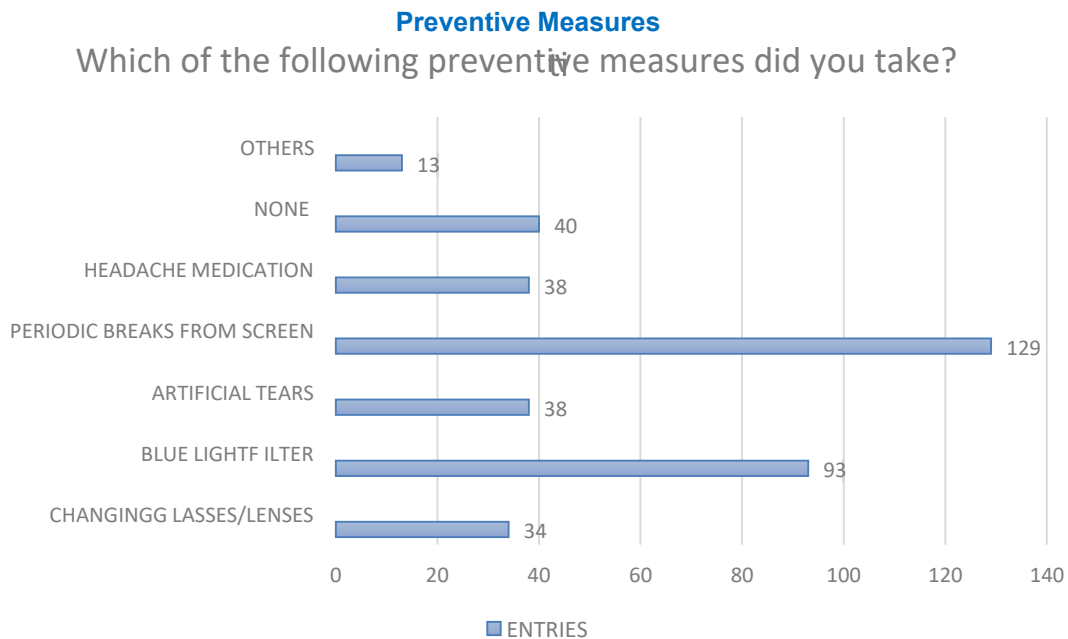


**Figure 9:** Intensity of Symptoms

**Table 2:** The most intense symptom suffered by the participants was headache (32 responses) followed by dryness of eye (20 responses)

SYMPTOM	MODERATE	INTENSE	N/A
Burning	79	9	112
Itching	63	7	130
Foreign Body Sensation	60	9	131
Tearing	100	5	95
Excessive Blinking	60	4	136
Redness	64	6	134
Eye Pain	69	12	119
Heavy Eyelids	59	10	131
Dryness	55	20	125
Blurred Vision	59	7	134
Double Vision	31	3	166
Difficulty Focusing For Near Vision	48	7	145
Increased Light Sensitivity	46	9	145
Headache	95	32	73
Colored Halos	25	1	174
Feeling of Worsening Eyesight	59	12	129

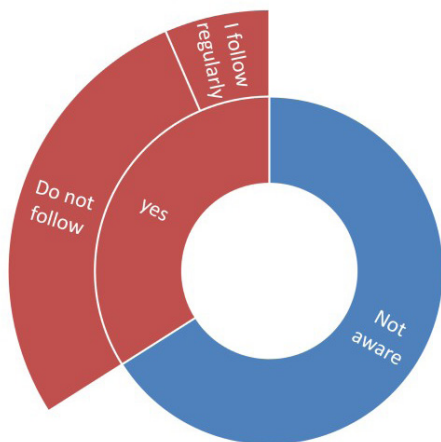




**Figure 10:** Preventive Measures

### 20/20/20 RULE

Are you aware of the 20/20/20 rule? If so, do you follow it?



**Figure 11:** 20/20/20 Rule

and hypermetropia contributing to the least that was 1% percentage. Against this the present scenario was a striking increase by 125.3 % with 55% needed visual correction. The study also brings you to the attention that many needed the change of lens in the pandemic and it was more than 25% of spectacle using population.

Before the pandemic, 39 students (20%) spent more than 6h with their screens, which is a stark contrast to 178 students (90%) who spent more than 6h on their screens during the pandemic. The data clearly shows a gross increase in the average screen time after the pandemic, almost doubling in duration.

The most frequent symptom associated with screen time was found to be headache (29 people claimed they always developed headaches, while 57 people claimed to develop headaches occasionally), followed by tearing of eye (12 people claimed

they always developed tearing, while 91 people claimed to develop tearing occasionally).

The most intense symptom suffered by the participants was headache (32 responses) followed by dryness of eye (20 responses). Colored halos and diplopia was least when it comes to intensity of symptoms but could not be ignored.

Most of the students were aware about the impact that long screen time could cause and they started to take periodic breaks and the use of blue light filter was documented in majority of the students. At the same time the study also documents a significant proportion of people were put in a position to take medications for headache and use of artificial tears for dryness.

### Recommendations

Reduction in the usage of the screen time and usage of blue filters in mobiles will be helpful. Many studies do confirm the ideal screen time is 2 hours and online classes should be limited to those hours only.

Reduced reliance on Ebooks and another alternative forms of hard copy should be equally encouraged which will help us to reduce the screen time.

We are in the need of hour to create awareness particularly among college students who after the post covid pandemic have started to use their laptops and iPads as the constant source of learning.

The study also recommends that post covid eye camp should be made in every Medical College and college students should be screened for visual problems students should be thought about the 2020 rule.

Basically, every 20 minutes spent using a screen, you should try to look away at something that is 20 feet away from you for a total of 20 seconds.

## Conclusion

The code pandemic has definitely affected the eyes adversely with a striking increase in the need for visual correction by 125.3. It has also posed other challenges when it comes to vision like use of contact lenses due to hygiene issues. It also presented with a spectrum starting from headache to diplopia and not just limited to eye dryness and headache.

The present study also documents that among people who already wear glasses were also severely affected and more than 25% needed a change in the power of glasses the increase usage of screen time most likely due to online classes has a definite association with the visual problems which drastically increased during the covid. Both in people who already are diagnosed with visual problems and in those who are diagnosed for the first time after the covid pandemic.

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