

# Descriptive Statistical Model of COVID-19 Pandemic's Effect on Human Eyesight

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## Abstract:

*Digital screens, such as televisions, computers, phones and smart gadgets have been connected to several health problems. Throughout the COVID-19 epidemic, different population groups may have adapted to different levels of screen time, which could have serious consequences for their health and well-being. According to the research, screen time is linked to eye strain, headaches, watery eyes, itching in the eyes, eye redness and a variety of other ailments. This increased disease burden is more common in those who have sedentary lives and engage in other unhealthy behaviors, which are expected to worsen during COVID-19 confinement or isolation. Screen time has increased during the epidemic, leading to potential negative health outcomes. Researchers and practitioners should examine existing guidelines and add evidence-based treatments to avoid harmful screen use among those who are afflicted. Such programs could address not just unhealthy screen use but also promote active lives, which could help people stay healthier during and after the epidemic. The purpose of the present research was to determine how the covid-19 is harmful on eyesight of human being. What effect it has on a normal human being residing in urban, rural area closed to the places like school, colleges, private sectors and government sectors. So, we decided to do research on impact of COVID-19 pandemic over our eyesight. So many people are facing digital eye strain (DES) which is a serious health hazard and can cause loss of vision or changes like blank spots or flashes, blurred vision, painful or red eyes, headache and other effects on health.*

**Keywords:** COVID-19 pandemic, Descriptive Statistical Analysis, digital eye strain (DES).

## Introduction

Visual display devices and computers are become an essential component of our daily life. Smartphones, tablets, laptops, electronic book readers, and computers collectively referred to as "digital devices" (DD) have significantly increased in popularity in recent years, and their use has led to a number of eye and vision symptoms that are now collectively referred to as "digital eye strain" (DES). Eye strain, headaches, blurred vision, and neck or shoulder pain are common symptoms of the aforementioned, and they frequently get worse with increased use of video display terminals (VDTs). In addition to raising the risk of developing CVS, greater usage of digital screens also raises the risk of headache, occupational overuse syndrome (OOS), an injury to the fingers and wrists brought on by repetitive motion, and psychosocial stress. According to estimates, there are roughly 60 million DES patients worldwide, and a million new instances of CSE are reported every year.

Across all age categories, the phenomena are visible. Approximately more than 50% of users are thought to have it. A 93.3 percent user rate for smartphones has been reported. Adults' use of mobile phones before bed has turned into a habit and is linked to sleep deprivation. The use of digital screens has sharply increased among teenagers, and with two thirds of the world now connected by mobile phones, digital eye strain is becoming more common. It may take the form of mild eye conditions or more serious issues that interfere with a person's everyday activities.

Eyesight is a severe health risk that can result in vision loss, alterations to vision such as blank spots or flashes, blurred vision, sore or inflamed eyes, headaches, and other health problems. And using a Google form, further studies are available on mobile. The effects of COVID-19 on people are substantial. data

was gathered from persons of diverse ages, from a variety of professions, and from several geographic locations.

More than 500 responses were gathered using a Google Form in this study. According to research, 67 percent of people in rural areas utilized more digital devices than those in urban areas, where 33 percent of people did. Men responded to the survey in greater numbers than women. Chi-Square Test and other data analysis techniques used in statistical methods are used to explore how age, region, and gender affect the effects of digital eye strain.

### **Objective**

- to determine whether age, location, and gender affect digital eye strain.
- In order to research which age group experienced the greatest eye issues?
- In order to determine the proportion of participants who experienced digital eye strain?
- determine whether the average screen time for men and women is equal.
- to determine which COVID-19-related eye conditions were most prevalent?

### **Research Methodology:**

Google forms are used to gather primary data for this study. 500 observations are gathered from the survey. According to the study, the COVID-19 pandemic is to blame for an increase in children's, adults', and young people's eyesight problems. To accomplish the goal, data from various age groups, regions, and professions were gathered.

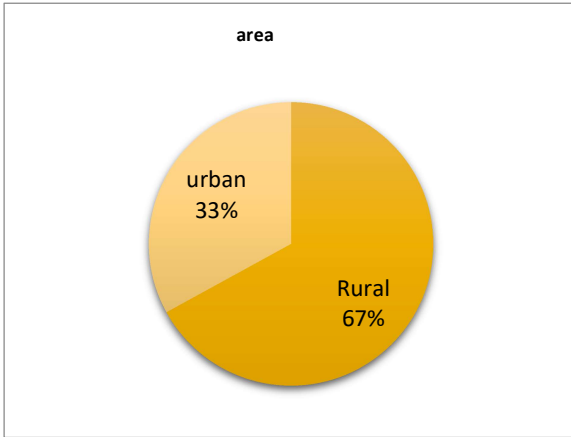
This study's main objective is to determine which age group spends the most time using various digital gadgets, as well as what factors influence that behaviour. Additionally, we aim to investigate how screen time varies by age group.

The chi-square test for independence of attributes was used to evaluate the data for how digital eye strain varies by age, location, and gender. Other data were studied graphically.

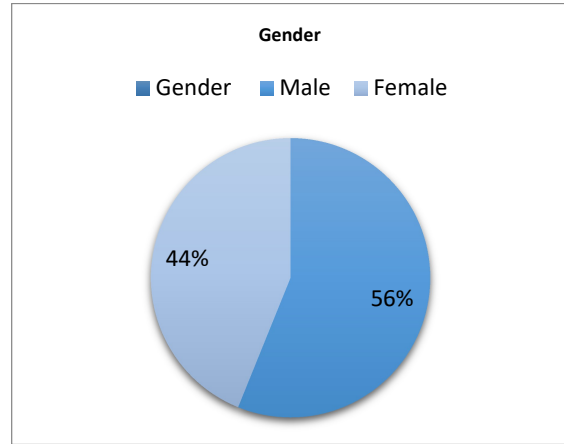
The questionnaire includes following questions:

- What is your current age?
- What is your Gender?
- To which area do you belong?
- Your profession is
  - student
  - public sector
  - private sector
  - other
- Has your screen time increased during covid-19 pandemic?
- Which digital devices do you use the most?
- Which application do you use most frequently?
- Do you think the covid-19 pandemic devices a rise in vision problem among the children's adults and youngsters?
- Do you think excessive screen timing is bad for are eyesight?
- Is there any eye problem you face due to increases in your screen timing?
- Do you face any other health condition in the pandemic except eye problem?
- Does your excessive screen timing also affect our mental condition?
- In which way to do think excessive screen timing affect our mental health?
- How many hours do you expect to spend on your digital health?
- How many hours do you expect to spend on your digital devises in a day?

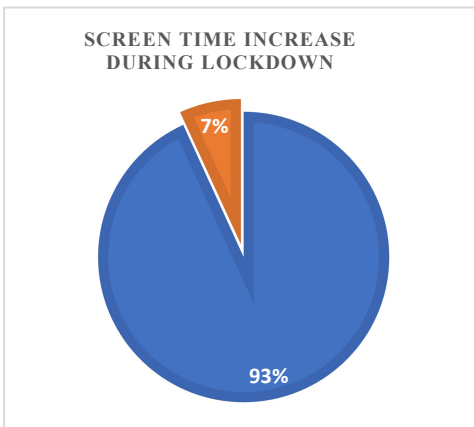
**Exploratory Analysis:**



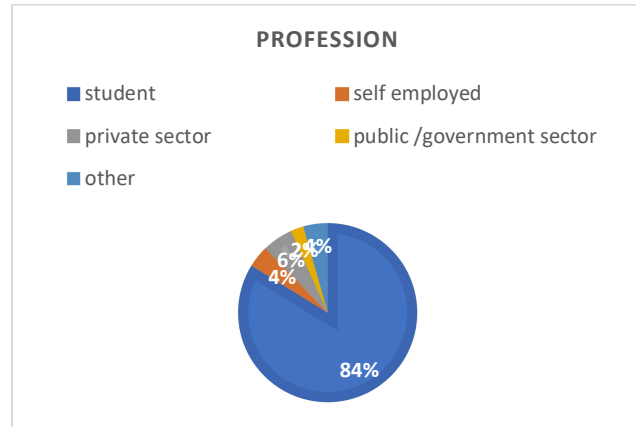
(a) maximum numbers of responses are from rural area.



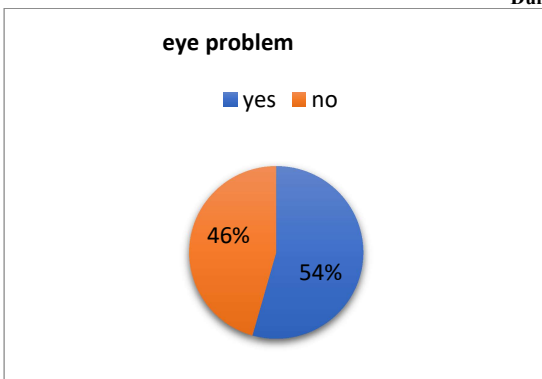
(b) Most of the responses are from males.



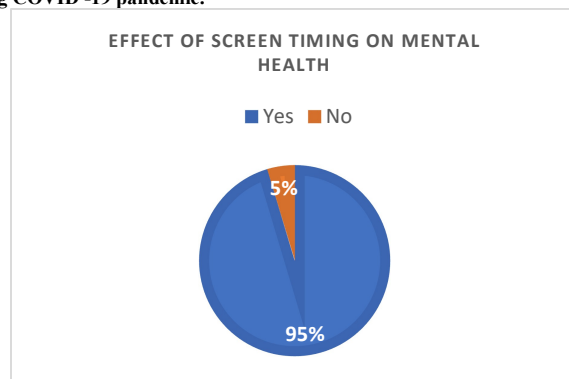
(c) 93% people think that screen timing increased



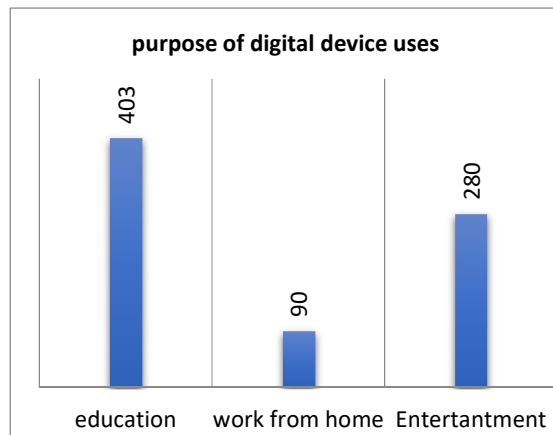
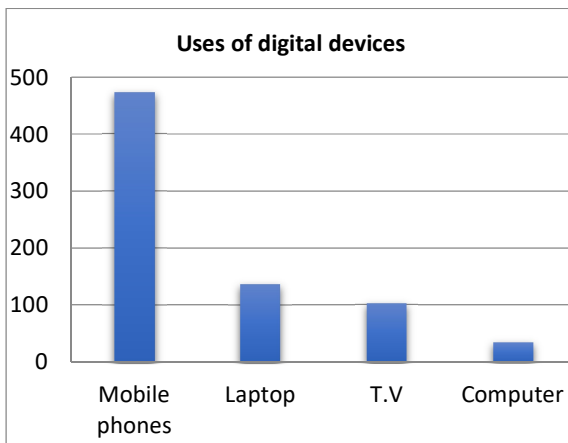
(d) Maximum numbers of responses are from students During COVID -19 pandemic.



(e) 54% peoples faced eye problems in COVID-19 pandemic health.

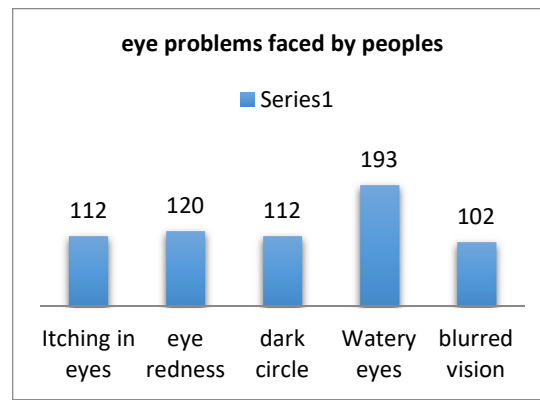
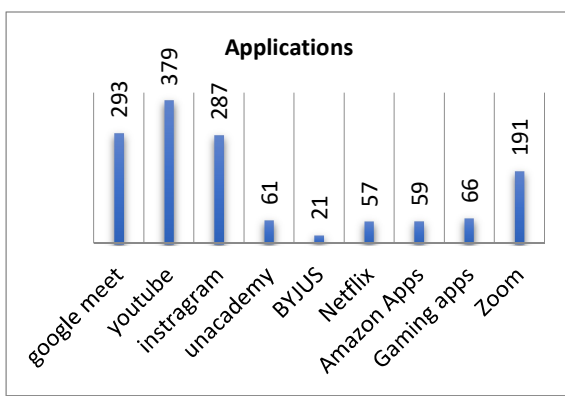


(f) maximum people think that excessive screen timing affect our mental health.



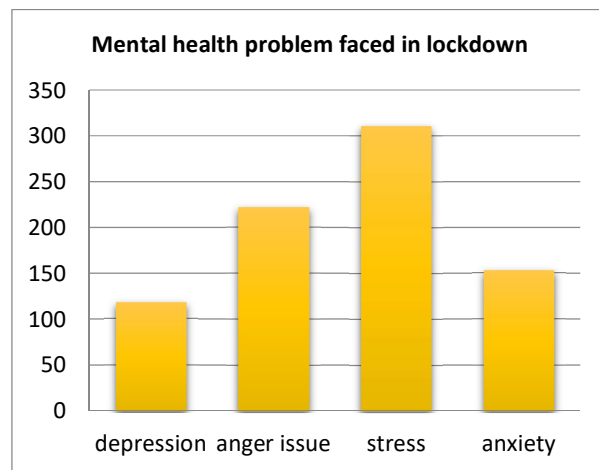
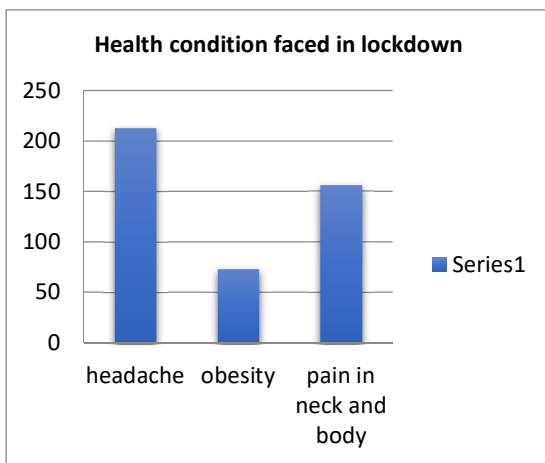
(h) of mobile phones are maximum as compare to others devices.

(i) Maximum people use digital devices for educational purpose.



(j) Uses of YouTube application are maximum in COVID-19 pandemic.

(k) Maximum number of people faced watery eyes problem in COVID-19 pandemic.



(l) Most of people suffered from headache in COVID-19 pandemic. (m) Maximum number of the people suffered from stress in lockdown.

### Descriptive statistical analysis

On an average of age in this data 22.292, on an average of time people spent on their digital devices 6.198758, On an average of time people expect to spent on their digital devices 3.563877. This implies that people spending time on digital devices is more than people expect to spend on their digital devices.

**Statistical Analysis:**

**Chi square test for Digital eye strain Vs. Gender.**

H<sub>0</sub>: There is no association between digital eye strain and gender.

H<sub>1</sub>: There is association between digital eye strain and gender.

Chi-square calculated value is 5.5315, P-value is 0.0186. Here p-value is less than 5% level of significance, we reject H<sub>0</sub> this implies that there is association between digital eye strain and gender.

**For people suffered from eye strain or not:**

From our survey of 487 people, it is observed that 50% of people are suffered from digital eye strain.

P: Proportion of people suffer from digital eye strain.

Test statistic:

H<sub>0</sub>: P=0.5 Vs. H<sub>1</sub>: P>0.5.

Z calculated value is 1.7600 and critical value is 1.96, accept H<sub>0</sub> 5% level of significance. This implies that people suffered from digital eye strain.

**Chi-square test for digital eye strain Vs. Area**

H<sub>0</sub>: Digital eye strain and Area are independent

H<sub>1</sub>: Digital eye strain and Area are dependent.

Area	Yes	No	Total
Rural	175	153	328
urban	91	68	159
Total	266	221	487

Chi square calculated value is 0.50301 and P-value is 0.4787. So, we accept H<sub>0</sub>. At 5% level of significance this implies that digital eye strain and area are independent.

**Chi-square test for Digital eye strain Vs. Age group**

H<sub>0</sub>: Digital eye strain and age group are independent.

H<sub>1</sub>: Digital eye strain and are group are dependent.

Age group	Yes	No	Total
10-20	76	74	150
20-30	168	138	306
30-40	13	7	20
40-50	5	3	8
Total	262	222	484

Chi-square calculated value is 1.9756 and P-value is 0.5775. So, accept H<sub>0</sub>. At 5% level of significance. This implies that digital eye strain and age group are independent.

**T-test for average of screen time in male and female same or not.**

H<sub>0</sub>: Average of screen time in Male and Female are same.

H<sub>1</sub>: Average of Screen time in Male and Female are not Same.

$$|t_{cal}| = 17.36301, t_{n-1, \alpha} = t_{4, 0.05} = -2.131846.$$

$|t_{cal}| > t_{n-1, \alpha}$  so, reject H<sub>0</sub>, this implies that average of screen time in male and female are not same. i.e. We conclude that male spent more time on digital devices rather than female.

## **Result and Discussion**

Digital eye strain, age and area are independent. There is association between digital eye strain and gender. Our claim that 50% people are suffered from digital eye strain is valid. We conclude that 54% of peoples faced various eye problems in COVID-19 pandemic. Male spent more time on digital devices rather than female. Maximum People suffered from watery eye problem in COVID-19 pandemic. People spending more time on digital devices than their expectations.

## **Conclusions:**

The study is conducted on different professions and different age groups. This is because of insufficient time and resources. This project was carried out on small data. We collected limited sample due to COVID-19 pandemic; we collected the data through Google form without taking personal interview. Age, area, gender and profession play a major role in how the COVID-19 pandemic affects the eyesight. From this study we have seen that due to COVID-19 pandemic the screen time is increased. We suggest that to set a standard time for the use of digital devices and don't use digital devices at night.

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