

# Prevalence and risk factor assessment of digital eye strain among children using online e-learning during the COVID-19 pandemic: Digital eye strain among kids (DESK study-1)

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**Purpose:** The aim of this study was to determine prevalence, symptoms frequency and associated risk factors of digital eye strain (DES) among children attending online classes during COVID-19 pandemic. **Methods:** The online electronic survey form was prepared on the Google app. Children/parents were asked to indicate the total duration of digital device use before and during COVID era. The symptoms of DES, its severity and frequency were recorded & measured with the Computer Vision Syndrome Questionnaire. **Results:** Two hundred and sixty one parents responded to the questionnaire, of these 217 were complete. Mean age of children was  $13 \pm 2.45$  years. Mean duration of digital device used during COVID era was  $3.9 \pm 1.9$  h which is more than pre COVID era ( $1.9 \pm 1.1$  h,  $P = <0.0001$ ). 36.9% ( $n = 80$ ) were using digital devices  $>5$  h in COVID era as compared to 1.8% ( $n = 4$ ) before COVID era. The most common digital device used were smartphones ( $n = 134$ , 61.7%). One hundred and eight children (49.8%) were attending online classes for  $>2$  h per day. Prevalence of DES in our cohort is 50.23% (109/217). Of these 26.3% were mild, 12.9% moderate and 11.1% of severe grade. Most common symptoms were itching and headache ( $n = 117$ , 53.9%). Multivariate analysis revealed age  $>14$  years ( $P = 0.04$ ), male gender ( $P = 0.0004$ ), smartphone use ( $P = 0.003$ ), use of device  $>5$  h ( $P = 0.0007$ ) and mobile games  $>1$  h/day ( $P = 0.0001$ ) as independent risk factors for DES in children. **Conclusion:** There is an increased prevalence of DES among children in COVID era. Parents should be considerate about duration, type and distance of digital device use to avoid DES symptoms in children.

**Key words:** Digital eye strain, Children, computer vision syndrome, COVID pandemic, online classes and e-learning

Educational institutions in the country have been closed since March, 2020 to halt the spread of the novel coronavirus disease (COVID). However, there is uncertainty as to when these schools will reopen. Since there is no immediate solution to stop the spread of the COVID pandemic, the closure of schools will continue, having a large effect on the learning of children. The outbreak has changed the traditional teaching method of using black boards to digital device-assisted online classes.<sup>[1]</sup>

This means that an extra time of sitting in front of a digital device will be required for this new e-learning system. Spending long hours in front of these devices can lead to many ocular problems in children. Digital eye strain (DES) is the most common eye problem associated with prolonged digital device use, characterized by symptoms such as dry eyes, itching, foreign body sensation, watering, blurring of vision, and headaches.<sup>[2]</sup>

The prevalence of digital eye strain is estimated to range from 25% to 93%, as reported in various studies.<sup>[3-5]</sup> Reddy *et al.* reported DES in 89.9% of students in their questionnaire-based study.<sup>[5]</sup> Higher prevalence rates of DES were observed in adolescents

using smartphones or in those who were regularly and excessively using digital devices ( $>2$  h daily and continuously).<sup>[6]</sup>

Although the ocular complications of digital device use have been extensively studied in adolescents and young adults, only a few studies have addressed DES in children.<sup>[7,8]</sup> Ocular symptoms and DES related to the excessive use of digital devices due to the increased duration of online classes in this COVID era have been discussed extensively in the media, but have not been properly studied and reported in the literature.

This study aimed to determine the prevalence, symptom frequency, and associated risk factors of DES among children of higher secondary schools who use digital devices to attend online classes during the COVID-19 pandemic.

## Methods

This was a questionnaire-based cross-sectional study analyzing DES among higher secondary school children who are

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attending online classes during the COVID-19 pandemic. An online survey questionnaire was developed by the authors, which comprised of 4 sections: demography of the children, digital device information, DES symptoms questionnaire, and good ocular health safety tips for children during digital device use. Before recruitment, participants were informed about the purpose, length, and anonymity of the study. The parents were also informed that their data would be used for research purposes, but without disclosing the identity of the participants. The study was conducted in accordance with the Declaration of Helsinki, and was approved by the appropriate Institutional Review Board.

The children or their parents were asked to indicate the average time in hours per day spent on each of the following activities: computer/PAD use, smartphone use, online classes, watching TV, and playing of video games during the COVID era as well as the total duration of digital device use before and during the COVID era. DES symptoms and their severity and frequency were recorded. The online electronic survey [Annexure 1] form was prepared on the Google survey forms app. The survey was circulated as a google link among social media groups of parents and was open to responses for one week in July after the lockdown in India. The DES symptoms and its severity were measured using the Computer Vision Syndrome Questionnaire (CVS-Q) developed by Segui *et al.*<sup>[9]</sup> The CVS-Q evaluated the intensity (moderate or intense) and frequency (never, occasionally, or always/often) of 16 eye strain-related symptoms, including burning sensation, itching in the eyes, foreign body sensation, watering, excessive blinking, redness, eye pain, heaviness in the eyelids, dryness, blurring of vision, double vision, difficulty in near vision, intolerance to light, colored halos, worsening of vision, and headache. Frequency was recorded as follows: NEVER = symptoms did not occur at all; OCCASIONALLY = sporadic symptoms or once a week; OFTEN OR ALWAYS = 2 or 3 times in a week or almost daily. Intensity was recorded as MODERATE or SEVERE.

The total score was calculated by applying the following formula:

$$\text{Score} = \sum_{i=1}^{16} (\text{frequency of symptom occurrence})_i \times (\text{intensity of symptom})_i$$

[Where Frequency: Never = 0, Occasionally = 1, Often or always = 2 & Intensity: Moderate = 1, Intense = 2].

The overall assessment was conducted by obtaining the total score, recorded as the DES score. The result of frequency X intensity was recorded as: 0 = 0; 1 or 2 = 1; 4 = 2. If the total score was  $\geq 6$  points, the child was considered to be suffering from digital eye strain. DES scores were further categorized as mild (DES score = 6-12), moderate (DES score = 13-18), and severe (DES score = 19-32).

All the data that was collected from the respondents were exported as Microsoft Excel sheets from the Google drive link, and statistical analysis was performed using the IBM SPSS Statistics software. Quantitative variables were presented as mean  $\pm$  standard deviation, while qualitative variables were presented as numbers and percentages.

The associated risk factors of DES were analyzed by univariate and multivariate logistic regression with age,

gender, device used (smartphone, desktop, laptop/tab), viewing distance, and duration of screen use. In the univariate analysis, the Chi-square or Fisher's exact test was used to investigate the associations between the qualitative variables. In the multivariate analysis, multiple logistic regression analysis was performed to identify the independent risk factors for DES by calculating the odds ratios (ORs) and their corresponding 95% CI. A *P* value  $<0.05$  was considered statistically significant.

## Results

A total of 261 parents/guardians responded to the questionnaire within the set time frame. Of these, we included in our study analysis the 217 participants who provided complete responses to the survey. The mean age of the children was  $13 \pm 2.45$  years, of whom 101 (46.54%) were males. Of the respondents, 56.2% were students in the 6<sup>th</sup> to 8<sup>th</sup> standard ( $n = 122$ ). In addition, 96.3% ( $n = 209$ ) of the children were attending online classes. The mean duration of digital device use during the COVID era was  $3.9 \pm 1.9$  h, which was longer than that in the pre-COVID era ( $1.9 \pm 1.1$  h,  $P = <0.0001$ ). Furthermore, 36.9% ( $n = 80$ ) of children were using digital devices for  $>5$  h in the COVID era as compared to 1.8% ( $n = 4$ ) of children before the COVID era. The most common digital devices used were smartphones ( $n = 134$ , 61.7%) for online classes, and 108 children (49.8%) were attending online classes for  $>2$  h per day. In total, 31.6% ( $n = 66$ ) of children used digital devices at  $<18$  inches from the eyes during the online classes. Table 1 shows the demographic and digital device use details as per the responses submitted by the parents.

The most common symptoms associated with DES in our study were itching ( $n = 117$ , 53.9%) and headache ( $n = 117$ , 53.9%). Double vision ( $n = 24$ , 11.1%) and seeing halos around objects ( $n = 44$ , 20.27%) were the least common presenting symptoms. In total, 49.76% of parents ( $n = 108$ ) thought that their children's eyesight worsened because of the online classes. Fig. 1 shows the number of children affected by the different CVS-Q symptoms with the frequency and severity.

The prevalence of DES in our cohort was 50.23% (109/217). Of these, 26.3% were of mild grade ( $n = 57$ ), 12.9% of moderate grade ( $n = 28$ ), and 11.1% of severe grade ( $n = 24$ ) DES scores. Fig. 2 shows the percentage of children with the different DES grades.

DES was significantly associated with male gender ( $P < 0.0001$ , odds ratio-1.59), smartphone use ( $P = 0.01$ , odds ratio-1.98), duration of digital device use  $>5$  h ( $P < 0.0001$ , odds ratio-3.38), digital device distance  $<18$  inches ( $P = 0.09$ , odds ratio-1.65), and use of mobile games  $>1$  h per day ( $P < 0.0001$ , odds ratio-16.69) in univariate analysis.

As shown in Table 2, the multivariate analysis revealed that age  $>14$  years ( $P = 0.04$ ), male sex ( $P = 0.0004$ ), smartphone preference over other digital devices ( $P = 0.003$ ), use of digital devices  $>5$  h ( $P = 0.0007$ ), and use of mobile games  $>1$  h/day ( $P = 0.0001$ ) were independent risk factors for DES in children.

## Discussion

Due to the spreading of the COVID-19 pandemic worldwide, many states or central governments have decided to close schools in order to maintain social distancing, as means of

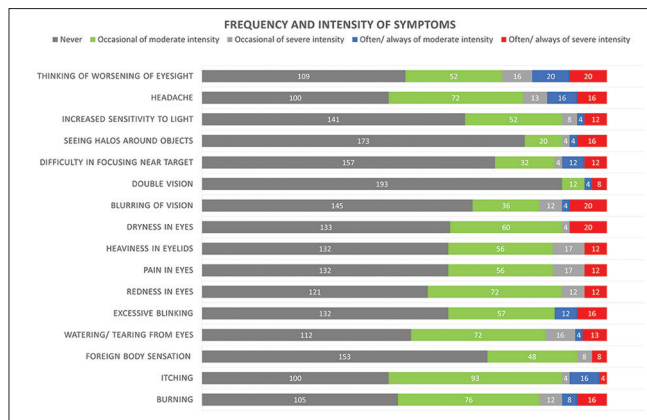


Figure 1: Number of children affected by different symptoms of digital eye strain with their frequency and severity

Table 1: Demographic characteristics and details of digital device usage

Demography	Number (%)
Mean age (years) ±SD	13±2.45 (range 10-18)
Male:Female	101: 116
Class	
6 <sup>th</sup> -8 <sup>th</sup>	122 (56.2%)
9 <sup>th</sup> -10 <sup>th</sup>	51 (23.5%)
11 <sup>th</sup> -12 <sup>th</sup>	44 (20.3%)
Duration of digital device usage (pre- COVID era)	
Mean duration (h)	1.9±1.1 (range 1-5)
<5 h	213 (98.1%)
>5 h	4 (1.8%)
Duration of digital device usage (COVID era)	
Mean duration (h)	3.9±1.9 (range 1-9)
<5 h	137 (63.1%)
>5 h	80 (36.9%)
Online classes attended	209 (96.3%)
Device used for online class	
Single device	165 (76.0%)
Multiple device	44 (20.3%)
Smart phone	134 (61.7%)
Laptop	88 (40.6%)
Desktop	20 (9.2%)
Tablet	16 (7.4%)
Duration of online class	
<1 h/day	13 (6%)
1-2 h/day	88 (40.6%)
>2 h/day	108 (49.8%)
Use of television	
Not watching	12 (5.5%)
<1 h	73 (33.6%)
1-2 h/day	88 (40.5%)
>2 h/day	44 (20.3%)
Use of smart phone for playing games	
Not using	37 (17.1%)
<1 h	120 (55.3%)
1-2 h/day	40 (18.4%)
>2 h/day	20 (9.2%)
Distance of digital device from eyes during online classes (n=209)	
<18 inches	66 (31.6%)
>18 inches	143 (68.4%)

COVID - Corona virus disease

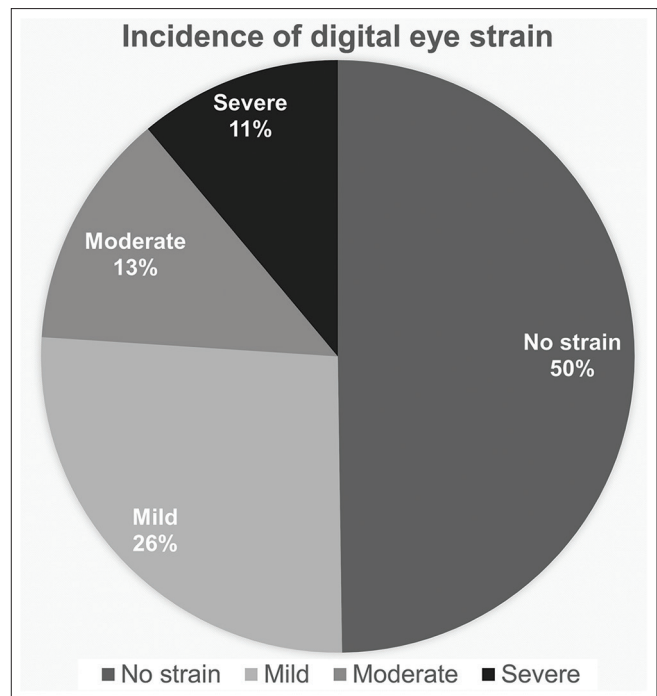


Figure 2: Percentage of children with the different grades of digital eye strain

halting the transmission of this deadly virus. However, the closure of schools has affected the education of more than 1.5 billion children and youths worldwide.<sup>[10]</sup> In India, 41% of the population belong to <18 years age group. The mean age of the participants in our study was 13 ± 2.45 years (range 10-18 years), which is representative of this major population.

School closure protects children from COVID, but this affects their education. To avoid this, educational institutions around the globe are shifting to the online teaching—e-learning method. Digital learning has become a daily necessity during this Covid-19 pandemic, leading to a marked increase in digital device use among children of school-going age. In our study, 96.3% of the children were attending online classes for e-learning. A European study reported that 68% of children regularly used computers and 54% undertook online activities.<sup>[11]</sup> Most of the children in our study were students in the class 6<sup>th</sup> to 8<sup>th</sup> standard. The average time spent in front of digital devices in our study was 3.9 ± 1.9 (range 1–9) h, which is similar to a study done in the UK, in which the participants spent approximately 4 h per day on digital devices.<sup>[11]</sup> In a study conducted in rural western India, they reported that the average time spent in front of a screen among children was approximately 2.7 ± 1.7 h,<sup>[12]</sup> which is less than our cohort. In our study, 36.9% of children spent >5 h on digital devices, which is similar to the pattern of a study conducted by Badri *et al.*, who reported that the average time spent on social media by students was 5.2 h per day.<sup>[13]</sup>

In our study, the most common device used for online classes was the smartphone (61.7%). Previous studies suggest that older age groups prefer using laptops and desktops to browse the internet, whereas younger adults/children are more likely to use smartphones for this purpose,<sup>[2,14]</sup> similar to our study. As reported by Shepard *et al.*, 87% of individuals

**Table 2: Multivariate logistic regression analysis of risk factors associated with digital eye strain**

Risk factor	OR	95% CI	P
Age >14 years	2.17	1.0-4.6	0.04
Male gender	4.2	1.9-9.4	0.0004
Smart phone preference	3.2	1.5-7.0	0.003
Digital device use $\geq$ 5 h/day	3.6	1.7-7.6	0.0007
Distance of screen from eyes <18 inches	0.8	0.4-1.9	0.72
Mobile games >1 h/day	8.1	2.9-22.3	0.0001

use two or more digital devices simultaneously for multiple tasks<sup>[2]</sup>; however, only 20.3% of children used multiple devices for online classes in our study.

DES constitutes a range of visual symptoms; its prevalence may be 50% or more among computer users.<sup>[15]</sup> In our study, the prevalence of DES was also found to be 50.23%. However, a recent meta-analysis reported that the pooled prevalence of DES is 19.7% in children.<sup>[7]</sup> In a study conducted in the private schools of west India, they reported the prevalence of DES as 17.9%.<sup>[16]</sup> The increased prevalence of DES in our study is probably due to the increased visual demand of digital device use in our cohort because of the online classes in this COVID era. There was a significant increase in the mean duration of digital device use during the COVID era ( $3.9 \pm 1.9$  h) compared to the pre-COVID era ( $1.9 \pm 1.1$  h,  $P = <0.0001$ ). In the COVID era, 36.9% of children were using digital devices for >5 h compared to 1.8% of children before the COVID era. This is probably the main reason for the increased prevalence of DES in our survey. In this study, 96.3% of children were attending online classes, out of which 49.8% of them were attending online classes for >2 h per day. In a study conducted in India before the COVID era, only 40% of children were using smartphones for school project purposes, and only 3.3% spent >5 h per day on digital devices.<sup>[15]</sup> In addition, 68.4% of children were using digital devices at a distance of >18 inches, which is similar to the study carried out by Ichapujani *et al.*<sup>[16]</sup> in which 56% were maintaining an ideal distance for digital device use.

Portello *et al.*<sup>[3]</sup> categorized the DES symptoms into two groups: 1) symptoms related to accommodation (blurred vision for near objects, headache, and eyestrain) and 2) symptoms related to dryness (burning sensation, foreign body sensation, itching, watering, intolerance to light). We also analyzed the DES symptoms using a validated questionnaire developed by Seguí *et al.*<sup>[9]</sup> The self-administered CVS-Q requires participants to report the intensity and frequency of 16 symptoms experienced during digital device use, where a cumulative score of six or more is considered as diagnostic of DES. The CVS-Q is a pretested, verified, and validated tool used to diagnose DES.<sup>[9]</sup> The most common symptoms reported in our study were itching and headache in 53.9% of cases. Headache, burning sensation, and tired eyes are common visual-related problems associated with DES. The most common symptoms reported by Shantkumari *et al.* among school children using digital devices were headache and burning sensation in 53.3% and 54.8% of cases, respectively.<sup>[17]</sup>

Multivariate analysis of current study revealed age >14 years, male sex, smartphone preference over other digital devices, use of digital devices >5 h, and use of mobile games >1 h/day were found to be independent risk factors for DES in children.

DES symptoms were reported to be more common in females; however, in our study, the male sex appeared to be at higher risk ( $P < 0.0001$ , odds ratio-1.59). Visual symptom scores in digital device users were found to be higher among females than males in a study done by Shima *et al.*<sup>[18]</sup> The results of our study indicate that male children are involved in multitasks on digital devices, making them to be at increased risk.

An advancing age of >14 years was also found to be a higher risk factor for DES in our study. Moon *et al.* also reported that symptoms of dry eye diseases were higher in the children of the older age group than in the younger age group. Children of a higher age were spending more hours on smartphone use, which may lead to a higher DES prevalence in older children.<sup>[19]</sup> There was a longer duration of online classes in higher grades than in the lower grades.

Smartphone preference over other digital devices was found to be an independent risk factor for DES among the children in our study. Continuous smartphone use leads to a decrease in the blink rate, causing dry eye-related problems. Smartphones are also used with a short viewing distance because of their small screens, thus causing more asthenopia symptoms. Moon *et al.* also reported that smartphone use was more commonly associated with dry eye disease (71%,  $P = 0.036$ ) as compared to other digital devices in a case-control study among school-going children.<sup>[20]</sup>

Duration in front of a screen of >5 h was found to be a significant risk factor for higher DES scores in our study, which is a well-known factor for asthenopia among digital device users. A study reported that the prevalence of DES was significantly higher in individuals who spent >4 h per day on digital devices.<sup>[16]</sup> Similar results were found in another study, which reported that the duration in front of a screen was directly proportional to the DES symptoms.<sup>[21]</sup> Shortening the duration of digital device use has a great effect on the symptoms of DES. The 20/20/20 rule has been suggested to minimize asthenopia symptoms during computer use. After every 20 minutes of digital device use, look at a distance of 20 feet for at least 20 seconds.<sup>[22]</sup>

During this COVID pandemic, there are restrictions on outdoor activities for children, which has led to an increase in the time spent by these children to play videogames on smartphones. Most children play videogames for long hours with maximum concentration and without any break; this can cause a newly described condition in children known as videogame vision syndrome.<sup>[23]</sup> Prolonged activity on smartphones while playing videogames can lead to DES and accommodative problems in children. In our study, the use of mobile games for >1 h per day was a significant risk factor for DES among children in multivariate analysis ( $P = 0.0001$ ). The prolonged and constant use of smartphone-based video games in children may have an adverse effect on their visual system and cause DES.<sup>[24]</sup>

A shorter screen distance has been associated with a higher risk of DES in children in some studies.<sup>[17,25]</sup> An increased incidence of eyestrain was reported by Shantakumari *et al.*<sup>[17]</sup> in their study of students who watched computer screens at a distance of <50 cm. This may be due to the disparity between the screen viewing distance and the individual's convergence.<sup>[26]</sup> However, in the current study, there was no significant association between screen distance and DES among the children in the multivariate

analysis, but in univariate analysis, the association was near to significance ( $P = 0.06$ ). This might be due to the response error because of the approximate reply without actual measurement of the digital device distance from the eyes. Bilton<sup>[27]</sup> described the one-two-ten (1,2,10) rule for the distances for digital devices: mobile phones at a distance of one foot; desktops and laptops at a distance of two feet; and television at a distance of 10 feet. The American Academy of Ophthalmology recommends a minimum distance of approximately 25 inches (about an arm's length) from the screen when using a computer.<sup>[28]</sup>

The purpose of our survey was to collect data on DES and to make the guardians and children aware of good ocular health habits and tips in order to avoid DES. We have added a section on good ocular hygiene and practices during digital device use in our questionnaire and insisted that the participants should practice the recommendations. Children should be encouraged to blink when reading text on screens. Avoid keeping the device close to the eyes, monitor screen time, and include a healthy diet rich in carotenoids and green leafy vegetables. Adequate sleep is necessary. Regular eye check-ups are strongly recommended.

In future studies, we will analyze the impact of good ocular health habits on DES scores.

Our study had a few limitations. Although this survey was circulated in parents' social media groups, we were unable to identify whether all the responders were parents/guardians of school-going children. In addition, our study was designed on a symptom-based questionnaire that requires responders to indicate the frequency and intensity of symptoms experienced during digital device use, which is a subjective feeling and varies from person to person, and may have recall bias. We have also not considered refractive error of children in account as it was not the part of our questionnaire.

## Conclusion

Our study highlights the higher prevalence of DES among children in the present scenario of the COVID pandemic and the effect of the e-learning teaching model on children's ocular health. Our findings highlight an important child ocular health issue in this era and make the parents, teachers, and eye care providers to be considerate about evidence-based measures to avoid DES in children.

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## Conflicts of interest

There are no conflicts of interest.

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## Annexure 1: Preview of survey form

8/4/2020

Survey on digital eye strain among kids (DESK)

# Survey on digital eye strain among kids (DESK)

Thank you for participating in our survey. Your feedback is important.

As we all know that extra-long hours of sitting in front of a computer and smartphones are essential for children in the new e-learning method during the COVID pandemic. But spending too much time in front of the computer and phone screens can lead to many ocular complications, this survey highlights the symptoms of digital eye strain among kids. Your participation is voluntary and data Collected will be used only for research purposes. The data collected will be kept confidential. Filling the form should not take more than 2 minutes.

### Basic information

1. What is age of your child

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2. What is gender of your child

*Mark only one oval.*

Female

Male

3. In which class your child is studying

*Mark only one oval.*

6th - 8th std

9th - 10th

11th - 12th

4. Are your child attending online classes

*Mark only one oval.*

- Yes  
 No  
 Maybe

5. Which device he/she is using for online classes

*Check all that apply.*

- Computer/desktop  
 Laptop  
 Smartphone  
 Notepad/ipad

6. Which is preferred device for online classes

*Mark only one oval.*

- Computer  
 Laptop  
 Notepad  
 Smartphone

7. What is the average distance of device from eyes during online classes

*Mark only one oval.*

- 10-18 inches  
 18-20 inches  
 21-25 inches  
 > 25 inches

8. How many total hours child is using digital devices in a day during lockdown

*Mark only one oval.*

- 1 hour  
 2 hours  
 3 hours  
 4 hours  
 5 hours  
 > 5 hours

9. How many total hours child is using digital devices in a day before lockdown

*Mark only one oval.*

- 1 hour  
 2 hours  
 3 hours  
 4 hours  
 5 hours  
 > 5 hours

10. How many hours child is watching TV

*Mark only one oval.*

- < 1 hour  
 1 - 2 hours  
 > 2 hours



11. How many hours child is playing video games on smartphones.

*Mark only one oval.*

- < 1 hour  
 1 -2 hours  
 > 2 hours

12. How many hours child is attending online classes in a day

*Mark only one oval.*

- < 1 hour  
 1 - 2 hours  
 > 2 hours

Symptoms of digital eye strain questionnaire

13. Have your child experienced burning in eyes

*Mark only one oval.*

- Never  
 Occasionally of moderate intensity  
 Occasionally of severe intensity  
 Always of moderate intensity  
 Always of severe intensity

14. Have your child experienced itching in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

15. Have your child experienced foreign body sensation in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

16. Have your child experienced watering/tearing in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

17. Have your child experienced excessive blinking of eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

18. Have your child experienced redness in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

19. Have your child experienced pain in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

20. Have your child experienced heaviness in eyelids

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

21. Have your child experienced feeling of dryness in eyes

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

22. Have your child experienced blurring of vision

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

23. Have your child experienced double vision

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

24. Have your child experienced difficulty in focusing near

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

25. Have your child experienced halos around objects

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

26. Have your child experienced increased sensitivity to light

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

27. Are your child complaining of headache

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

28. Have you thought that there is worsening of eye sight of your child

*Mark only one oval.*

- Never
- Occasionally of moderate intensity
- Occasionally of severe intensity
- Always of moderate intensity
- Always of severe intensity

8/4/2020

Survey on digital eye strain among kids (DESK)

### Recommendations for protection from digital devices in kids

#### Safety Tips for Children during Screen use

The best way to deal with possible effects of screens on children's eye is to help them set good habits for use.

Practice this recommendations and will review your symptoms after 14 days.

Follow the 20-20-20 rule: every 20 minutes, look at least 20 feet away for 20 seconds.

Set a timer to remind the child how often to look into the distance.

Alternate reading an e-book with a real book and encourage kids to look up and out the window every other chapter.

After completing a level in a video game, look out the window for 20 seconds.

Avoid using screens outside or in brightly lit areas, where the glare on the screen can create strain.

Adjust the brightness and contrast of the screen so that it feels comfortable.

Use good posture when using a screen. Poor posture can contribute to muscle tightness and headaches associated with eye strain.

Encourage your child to hold digital media farther away: 18 to 24 inches is ideal.

Remind them to blink when watching a screen.

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