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Original Research Article

Mitigating eye strain in the digital era: The efficacy of the 20-20-20 rule

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Abstract

Purpose: To evaluate the effectiveness of the 20-20-20 rule in alleviating symptoms of digital eye strain (DES) among individuals with prolonged screen exposure.

Materials and Methods: A prospective observational study was conducted in the Ophthalmology Outpatient Department of a tertiary care hospital in Panipat. A total of 268 participants aged 18–60 years, each reporting more than 4 hours of daily screen use, were enrolled. Participants were instructed to follow the 20-20-20 rule, which involves taking a 20-second break every 20 minutes to focus on an object at least 20 feet away. Data were collected using Google Forms at baseline, 2 weeks, and 4 weeks. The questionnaire recorded demographic details, screen usage, and asthenopic symptoms. Symptom relief and adherence to the rule were assessed at follow-up visits.

Results: The mean age of participants was 45.93 years, with an average daily screen time of 6.34 hours. Mobile phones were the primary devices used by 78% of participants. At the 4-week follow-up, 59% reported symptom relief, with significant improvements in tired eyes ($p=0.002$), headache ($p<0.01$), and burning sensation ($p<0.01$). Looking at a distance was effective for 78% of participants ($p<0.001$). However, 41% continued to experience persistent symptoms despite adherence, indicating the need for additional interventions.

Conclusion: The 20-20-20 rule is a simple and effective strategy for reducing symptoms of digital eye strain. However, outcomes vary depending on adherence and individual factors. Incorporating additional preventive measures and long-term strategies may further enhance eye comfort and visual health in the digital era.

Keywords: Digital eye strain, 20-20-20 rule, Computer vision syndrome, Screen time, Eye health, Symptom relief, Visual ergonomics.

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1. Introduction

In the 21st century, the rapid rise of digital technology has significantly transformed how we communicate, work, and engage with entertainment, leading to a marked increase in screen time across all demographics. This surge in screen use has contributed to the growing prevalence of digital eye strain (DES), also known as computer vision syndrome (CVS), which is now recognized as a major public health concern worldwide.[1,2] Recent studies suggest that approximately 70–75% of individuals who use electronic devices for extended periods report experiencing some form of ocular discomfort, with estimates indicating that nearly 60 million people globally are affected by DES each year.[3,4] As reliance on digital screens continues to rise, it becomes increasingly important to understand the long-term effects of prolonged screen exposure on ocular health and to identify effective strategies for alleviating its negative impacts.[5,6]

DES manifests as a constellation of asthenopic symptoms, including ocular irritation, dryness, blurred vision, headache, and even neck or back discomfort.[7] Numerous factors contribute to DES, such as inappropriate screen brightness, glare, improper viewing distances, poor ergonomic practices, and environmental conditions such as lighting and humidity.[8,9] In addition, pre-existing refractive

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errors or visual impairments can exacerbate these symptoms, underscoring the importance of proper vision care and workplace adjustments.[10] The rising prevalence of DES highlights the urgent need for effective preventive measures to mitigate ocular strain caused by extended screen time.[11]

Research shows that one of the primary mechanisms underlying DES is a reduction in the blinking rate during prolonged screen use. Under normal conditions, individuals blink around 22 times per minute, but this rate drops to nearly 7 blinks per minute when focusing on digital devices. This reduction results in poor tear distribution across the ocular surface, leading to symptoms such as dryness, burning, and a foreign body sensation.[12] Excessive screen exposure has also been strongly associated with increased visual discomfort, further reinforcing the need for practical and effective strategies to minimize strain.[13,14]

One such strategy is the 20-20-20 rule, which has gained popularity as a simple preventive measure for DES. The rule advises individuals to take a 20-second break every 20 minutes of screen use and focus on an object at least 20 feet away. This practice is intended to provide the eyes with relief from sustained near work, thereby reducing strain and promoting relaxation. For someone working a full eight-hour day at a computer, adherence to the rule would involve taking 24 breaks, amounting to about 8 minutes of distant focus daily. Although widely recommended, robust empirical evidence supporting the 20-20-20 rule remains limited, indicating the need for further investigation.

The present study was designed to critically evaluate the effectiveness of the 20-20-20 rule in reducing symptoms of DES among individuals with prolonged screen use. By examining symptom changes over time and participant adherence, this research aims to determine whether this simple behavioral intervention can significantly improve visual comfort and overall eye health in today's increasingly screen-dependent world.[11]

2. Materials and Methods

2.1. Study design

This was a prospective observational study designed to evaluate the efficacy of the 20-20-20 rule in reducing digital eye strain (DES). The study was conducted in the Ophthalmology Outpatient Department of a tertiary care hospital in Panipat after obtaining approval from the Institutional Ethics Committee. The duration of the study was 4 weeks, with follow-up assessments scheduled at 2 weeks and 4 weeks following the introduction of the 20-20-20 rule. Data collection was performed using Google Forms, which were used both for obtaining informed consent and administering the questionnaire. The study population included doctors, nurses, students, and patients visiting the outpatient department who reported using digital screens for more than 4 hours daily.

2.2. Inclusion criteria

1. Age between 18 and 60 years.
2. Daily use of digital screens (computer, smartphone, tablet, etc.) for >4 hours.
3. Provision of informed consent to participate for the entire study duration.

2.3. Exclusion criteria

1. Unwillingness to follow the prescribed 20-20-20 rule.
2. Current use of contact lenses, prior history of refractive surgery, or presence of uncorrected refractive errors.
3. Presence of significant ocular disease (e.g., glaucoma, cataract) that could influence outcomes related to eye strain.

2.4. Questionnaire and baseline assessment

Eligible participants were enrolled and asked to complete a structured questionnaire at baseline (Day 0). The questionnaire collected the following information:

1. Demographics: name, age, gender, occupation
2. Screen use details: average daily screen time (in hours), type of device most frequently used
3. Systemic illnesses: such as diabetes, hypertension, or thyroid disorders
4. Asthenopic symptoms (presence/absence):
   a. Ocular discomfort
   b. Dry eyes
   c. Blurred vision
   d. Headache
   e. Ocular surface irritation
   f. Eye strain
   g. Sensitivity to bright light

The questionnaire was adapted from previous studies assessing visual fatigue but was not formally validated. This is a limitation of the study; validated instruments such as the Computer Vision Syndrome Questionnaire (CVS-Q) or the Ocular Surface Disease Index (OSDI) are recommended for future research.

2.5. Intervention: The 20-20-20 rule

After completing the baseline assessment, participants were instructed to follow the 20-20-20 rule: after every 20 minutes of screen use, take a 20-second break and focus on an object at least 20 feet away. To support adherence, participants were advised to set reminders on their phones or use mobile applications specifically designed for this purpose.

2.6. Follow-up assessments

Participants were reassessed at 2 weeks and 4 weeks after initiating the intervention.

1. At 2 weeks, participants completed the same questionnaire as at baseline, with additional

questions assessing their level of adherence and any changes in asthenopic symptoms.

2. At 4 weeks, participants completed the questionnaire again to evaluate whether symptoms improved, remained unchanged, or worsened. Adherence to the rule was reassessed at this stage.

2.7. Adherence measurement

Adherence was assessed using the question: *"*How frequently were you able to follow the 20-20-20 rule?" with the following response categories:

1. Always (≥90% of the time)
2. Frequently (50–89% of the time)
3. Occasionally (10–49% of the time)
4. Rarely (<10% of the time)

Participants were also asked whether they used reminders (e.g., phone alarms or apps) to help maintain adherence.

2.8. Statistical analysis

Data were analyzed using SPSS version 25 (IBM Corp., Armonk, NY). Categorical variables were compared using the Chi-square test, while continuous variables were analyzed using the Student's t-test. A p-value <0.05 was considered statistically significant.

3. Result

The study included 268 participants with a mean age of 45.93 years and an average daily screen time of 6.34 hours, reflecting prolonged digital exposure in a middle-aged population. Such high levels of screen use suggest an increased likelihood of experiencing asthenopic symptoms, particularly among individuals with pre-existing age-related visual changes.

The largest occupational category was students (201 participants), indicating that this group dominated the study population. Doctors constituted 43 participants, while chartered accountants accounted for 10. Teachers (6 participants) and nursing officers (8 participants) were less represented as shown in **Figure 1**.

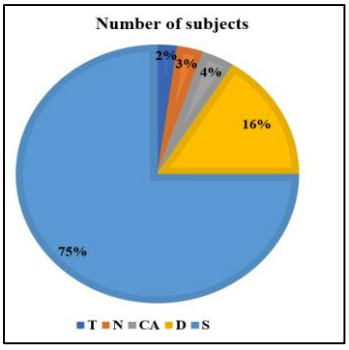

Figure 1: Occupation distribution among the participants

Table 1: Digital device usage

Digital device used?	Number of subjects
M	209
C	59
Total	268

The distribution of subjects based on the type of digital device used shows that, out of the 268 participants, the majority (209 subjects) reported using Mobile (M), whereas 59 subjects used Computer (C). This indicates that Mobile (M) is the more commonly used device among the subjects, representing a significantly larger proportion of the total, as shown in **Table 1**.

Table 2: Breaks taken during digital device usage

Do you take breaks between usage?	Number of subjects	p-value
Yes	251	< 0.01
No	17	

Out of the 268 participants, the vast majority (251; 94%) reported taking breaks during digital device use, while only 17 participants (6%) did not. This difference was statistically significant ($p < 0.01$), indicating that taking breaks was a common practice among the study population. Such high compliance reflects a general awareness of preventive strategies for digital eye strain, with regular breaks contributing to the reduction of ocular discomfort and the promotion of overall visual health, as shown in **Table 2**.

Table 3: Association of symptoms with screen time

Symptom	Yes (Number of subjects)	No (Number of subjects)	p-value
Blurred vision while watching a computer screen	41	227	1.0
Dry eyes after long screen time	110	158	0.004
Irritated burning eyes after long screen time	124	144	0.246
Headache after long screen time	151	117	0.044

Prolonged screen exposure was associated with several symptoms in the study population. Blurred vision while using a computer was reported by 41 participants; however, the association with screen time was not statistically significant ($p = 1.0$). In contrast, dry eyes were significantly associated with screen use, reported by 110 participants ($p = 0.004$). Headache was also a significant finding, reported by 151 participants ($p = 0.044$). The most prominent symptom was tired eyes, noted by 206 participants, with a highly significant association ($p < 0.01$). Ocular surface irritation, however, was not significantly associated with screen exposure ($p = 0.246$).

Overall, dry eyes, headache, and tired eyes demonstrated strong links with prolonged screen use, underscoring the need for effective interventions to alleviate these asthenopic symptoms, as summarized in **Table 3**.

3.1. After following 20 20 20 rule

Table 4: Effectiveness of the 20-20-20 rule in relieving symptoms

Did it help in relieving symptoms?	Number of subjects	p value
Yes	158	0.004
No	110	

As shown in **Table 4**, 158 participants (59%) reported relief in symptoms after adopting the 20-20-20 rule, whereas 110 participants (41%) did not experience any improvement. This difference was statistically significant ($p = 0.004$), indicating that the rule was effective for the majority of participants. Nonetheless, the persistence of symptoms in 41% of individuals suggests that additional or complementary strategies may be required to adequately address digital eye strain.

Table 5: Looking at a distance for symptom relief

Looking at distance helped in relieving symptoms?	Number of subjects	p-value
Yes	209	<0.001
No	59	

The association was highly significant ($p < 0.001$), indicating that looking at a distant object was perceived as an effective strategy for alleviating symptoms of digital eye strain by the majority of participants. This finding underscores the potential benefit of incorporating regular breaks involving distant viewing into daily routines during prolonged screen use, as summarized in **Table 5**.

Table 6: Effectiveness of interventions in relieving specific symptoms

In relieving which symptom it helped you?	Number of subjects	p-value
Burning eye sensation	90	< 0.01
Dry eyes	68	0.017
Headache	104	< 0.01
Irritation	92	< 0.01
Tired eye	130	0.002
No relief	44	< 0.01

The effectiveness of the intervention in relieving specific symptoms is presented in **Table 6**. A considerable number of participants reported improvement across different symptoms, including 90 for burning eye sensation, 68 for dry eyes, 104 for headache, 92 for ocular irritation, and 130 for tired eyes. All these associations were statistically significant ($p < 0.01$). The only exception was the "No relief" category, where 44 participants reported persistent symptoms; however, the p-value (<0.01) indicates a significant deviation from a neutral outcome. Overall, these findings suggest that the intervention was effective in alleviating discomfort for the majority of participants.

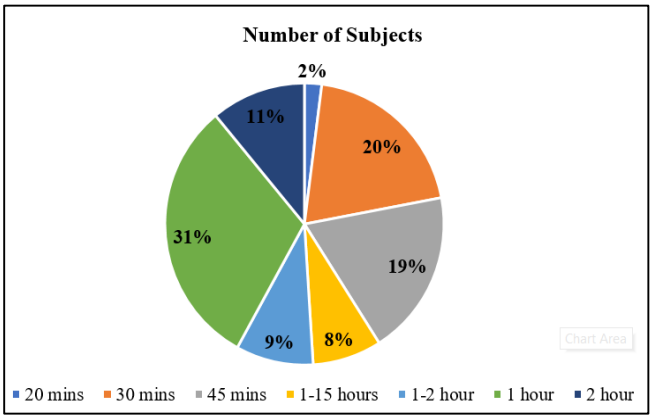

Figure 2: Break durations reported by participants

Among the participants, the most frequently reported break interval was one hour, noted by 83 individuals. Breaks every 30 minutes were reported by 55 participants, while 51 reported taking breaks after 45 minutes. Longer intervals were less common, with 29 participants taking breaks every 2 hours and 22 reporting breaks between 1 and 1.5 hours. These findings, illustrated in **Figure 2**, indicate that although many participants acknowledged the importance of taking breaks, there was substantial variation in both the frequency and duration of rest periods.

4. Discussion

The findings of this study provide strong evidence supporting the efficacy of the 20-20-20 rule in alleviating symptoms of digital eye strain (DES). After adopting the rule, 59% of participants reported improvement in symptoms such as burning sensation, dryness, headache, ocular irritation, and tired eyes. These outcomes are consistent with previous studies demonstrating that structured breaks can reduce ocular discomfort associated with prolonged screen exposure. For example, Sheppard and Wolff identified reduced blink rate as a key factor in the development of DES, highlighting that interventions encouraging blinking or regular visual breaks are effective in relieving symptoms.[2] The 20-20-20 rule, which involves a 20-second break every 20 minutes of screen use to focus on a distant object, likely promotes restoration of blink frequency and reduces ocular fatigue. Similarly, Rosenfield emphasized that scheduled breaks and ergonomic adjustments can substantially reduce eyestrain and headache, findings that align with the present study where 56% of participants reported fewer headaches after following the rule.[15] Akinbinu and Mashige also observed that ergonomic measures, including simple strategies such as the 20-20-20 rule, improved DES symptoms among individuals with high digital exposure, further supporting our results.[16]

Despite these encouraging outcomes, 41% of participants did not experience significant relief. This may be explained by several factors, including inconsistent adherence to the rule, the presence of pre-existing ocular surface disease (such as dry eye), and environmental conditions such as poor lighting or glare. Moreover, symptom severity at baseline may have influenced outcomes, as individuals with more advanced DES may require additional interventions beyond scheduled breaks. Dutta et al., for instance, found that patients with pre-existing dry eye disease experienced limited improvement with the 20-20-20 rule alone, suggesting that more comprehensive management strategies are needed in this subgroup.[17]

While this study demonstrates the potential of the 20-20-20 rule for a majority of participants, it also highlights variability in individual responses. Future research should aim to incorporate objective measures such as blink rate and tear film stability to better evaluate physiological changes during screen use and breaks. Longer-term studies are also required to assess the sustained benefits of this rule and its potential interaction with complementary interventions such as ergonomic adjustments, adequate hydration, and the use of anti-reflective screens. Additionally, the influence of demographic and occupational factors such as age, pre-existing visual conditions, and work-related demands warrants further investigation.

5. Strengths

This is among the few prospective studies from India to evaluate the 20-20-20 rule using a relatively large sample size and structured follow-up assessments. It highlights the real-world applicability of a simple, cost-free intervention for digital eye strain in a clinical setting.

6. Limitations

The study relied on self-reported symptoms and self-reported adherence, which may have introduced recall bias. The questionnaire was not formally validated, potentially affecting the accuracy of symptom assessment. Objective clinical measures such as blink rate or tear film breakup time were not included. Additionally, changes in total screen time during the study were not controlled for, which may have influenced outcomes. Finally, the follow-up duration was limited to four weeks, which is likely insufficient to evaluate the long-term impact of DES in occupational settings.

7. Conclusion

In conclusion, this study demonstrates that the 20-20-20 rule is an effective and practical strategy for reducing symptoms of digital eye strain, particularly tired eyes, headache, and burning sensations. While the majority of participants experienced symptomatic relief, a substantial proportion did not, indicating that factors such as screen settings, lighting conditions, and underlying ocular or systemic health may influence outcomes. Future research should aim to refine the frequency and duration of breaks, evaluate the long-term impact of the rule, and explore its role in combination with additional preventive interventions.

The key message of this study is that the 20-20-20 rule, though simple and cost-free, provides measurable benefits for most digital screen users in an Indian clinical setting, underscoring its value as a feasible behavioral intervention for the prevention and management of digital eye strain.

8. Source of Funding

None.

9. Conflict of Interest

None.

10. Ethical Approval

Ethical No.: IEC/Approval/2024/149.

References

1. Coronel-Ocampos J, Gómez J, Gómez A, Quiroga-Castañeda PP, Valladares-Garrido MJ. Computer visual syndrome in medical students from a private university in Paraguay: A survey study. *Front Public Health*. 2022;10:935405. https://doi.org/10.3389/fpubh.2022.935405
2. Sheppard AL, Wolffsohn JS. Digital eye strain: prevalence, measurement and amelioration. *BMJ Open Ophthalmol*. 2018;3(1):e000146. https://doi.org/10.1136/bmjophth-2018-000146
3. Agarwal R, Tripathi A, Khan IA, Agarwal M. Effect of increased screen time on eyes during COVID-19 pandemic. *J Family Med Prim Care*. 2022;11(7):3642–7. https://doi.org/10.4103/jfmpc.jfmpc_2219_21
4. Pavel IA, Bogdanici CM, Donica VC, Anton N, Savu B, Chiriac CP, et al. Computer Vision Syndrome: An Ophthalmic Pathology of the Modern Era. *Medicina (Kaunas)*. 2023;59(2):412. https://doi.org/10.3390/medicina59020412
5. Kumar N, Sharma N. To determine the prevalence of computer vision syndrome among computer users: a descriptive study. *Eur J Mol Clin Med*. 2020;7(10):3933–8.
6. Coles-Brennan C, Sulley A, Young G. Management of digital eye strain. *Clin Exp Optom*. 2019;102(1):18–29. https://doi.org/10.1111/cxo.12798
7. Gammoh Y. Digital eye strain and its risk factors among a university student population in jordan: A cross-sectional study. *Cureus*. 2021;13(2):e13575. https://doi.org/10.7759/cureus.13575
8. Sheedy JE, Hayes JN, Engle J. Is all asthenopia the same? *Optom Vis Sci*. 2003;80(11):732–9. https://doi.org/10.1097/00006324-200311000-00008
9. Portello JK, Rosenfield M, Bababekova Y, Estrada JM, Leon A. Computer-related visual symptoms in office workers. *Ophthalmic Physiol Opt*. 2012;32(5):375–82. https://doi.org/10.1111/j.1475-1313.2012.00925.x
10. Bahkir FA, Grandee SS. Impact of the COVID-19 lockdown on digital device-related ocular health. *Indian J Ophthalmol*. 2020;68(11):2378–83. https://doi.org/10.4103/ijo.IJO_2306_20
11. Tribley J, McClain S, Karbasi A, Kaldenberg J. Tips for computer vision syndrome relief and prevention. *Work*. 2011;39(1):85–7. https://doi.org/10.3233/WOR-2011-1183
12. Anshel J, editor. Visual Ergonomics Handbook. New York: Taylor and Francis; 2005.
13. Boulet C. The '20/20/20 rule'–When good intentions and axiomatic habit displace best practices. *Can J Optom*. 2016;78(4):6.

14. Almudhaiyan TM, Aldebasi T, Alakel R, Marghlani L, Aljebreen A, Moazin OM. The prevalence and knowledge of digital eye strain among the undergraduates in Riyadh, Saudi Arabia. *Cureus*. 2023;15(4):e37081. https://doi.org/10.7759/cureus.37081
15. Rosenfield M. Computer vision syndrome: a review of ocular causes and potential treatments. *Ophthalmic Physiol Opt*. 2011;31(5):502–15. https://doi.org/10.1111/j.1475-1313.2011.00834.x
16. Akinbinu TR, Mashalla YJ. Impact of computer technology on health: Computer Vision Syndrome (CVS). *Med Pract Rev*. 2014;5(3):20–30.
17. Datta S, Sehgal S, Bhattacharya B, Satgunam PN. The 20/20/20 rule: Practicing pattern and associations with asthenopic symptoms. *Indian J Ophthalmol*. 2023;71(5):2071–5. https://doi.org/10.4103/ijo.IJO_2056_22

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