

Comparing the Outcomes of Dry Eye in Patients with Daily Reminders to Practice 20-20-20 Vision Rule Vs without Reminders**Drishti Kaushal¹, Arushi Rattan², Sonal Jamwal³, Anerudh Mathur⁴, Anuj Kaushal⁵, Abhinav Sharma⁶**¹Medical officer Specialist, CHC Kotkhai, District Shimla, Himachal Pradesh, India²Medical officer Specialist, DDU-ZH, Shimla, Himachal Pradesh, India³Medical officer Specialist, CH Ghwandal, District Bilaspur, Himachal Pradesh, India⁴Post Doctoral Fellow, Department of Otorhinolaryngology, Christian Medical College, Vellore, Tamil Nadu, India⁵Junior Resident, Department of Community Medicine, Indira Gandhi Medical college, Atal Medical Research University, Shimla, Himachal Pradesh, India⁶Medical Officer, Community Health Centre, Noradhar, Himachal Pradesh, India

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Abstract

Introduction: Prolonged digital device use is associated with digital eye strain (DES), commonly manifesting as dry eye disease (DED). The 20-20-20 rule, which recommends a 20-second break to view an object 20 feet away every 20 minutes of screen time, is widely suggested to reduce ocular discomfort, but adherence is often poor. The objective of the study is to evaluate the effectiveness of daily reminders to practice the 20-20-20 rule in reducing subjective and objective dry eye parameters among adults with prolonged screen exposure.

Materials and Methods: In this prospective, randomized controlled study, 100 participants aged 18–50 years with ≥ 6 hours/day of screen exposure and mild-to-moderate dry eye symptoms (OSDI ≥ 15) were enrolled. Participants were randomly assigned to receive daily electronic reminders for the 20-20-20 rule (Group A, n=50) or no reminders (Group B, n=50). Baseline and 1-month assessments included Ocular Surface Disease Index (OSDI), Tear Break-Up Time (TBUT), and Schirmer's test. Between-group comparisons were analyzed using independent t-tests; $p < 0.05$ was considered significant.

Results: Baseline characteristics were comparable between groups. After one month, Group A showed significant improvement in OSDI (18.2 ± 5.3 vs 25.7 ± 6.0 , $p < 0.001$), TBUT (9.3 ± 1.5 s vs 7.1 ± 1.4 s, $p < 0.001$), and Schirmer's test (15.8 ± 2.6 mm vs 13.0 ± 2.4 mm, $p < 0.001$) compared to Group B.

Conclusion: Daily reminders to practice the 20-20-20 rule significantly reduce subjective dry eye symptoms and enhance tear film stability and secretion in prolonged screen users. Reminder-based behavioural interventions represent a simple, low-cost strategy to prevent and manage DES.

Keywords: Digital eye strain, 20-20-20 rule, Dry eye disease.

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Introduction

The widespread use of digital devices in modern life has led to a significant increase in screen time among adults and adolescents [1]. Prolonged exposure to computers, smartphones, and tablets is associated with visual discomfort and ocular surface disturbances, commonly referred to as Computer Vision Syndrome (CVS) or digital eye strain [2]. Among its manifestations, dry eye disease (DED) is a frequent complaint, characterized by ocular dryness, irritation, burning sensation, blurred vision, and visual fatigue [3,4]. The prevalence of dry eye symptoms in regular screen users has been reported to range from 25% to 50%, reflecting a growing public health concern

[5,6]. The pathophysiology of screen-related dry eye is multifactorial. Reduced blink rate during prolonged screen use leads to tear film instability, increased tear evaporation, and ocular surface inflammation [7]. Additionally, improper viewing distance, poor ergonomics, and continuous focus on near objects contribute to ocular strain [8]. If left unaddressed, these symptoms can negatively impact work productivity, quality of life, and overall visual comfort [9]. Despite its high prevalence, preventive strategies are often underutilized, and many individuals rely solely on artificial tear supplementation rather than behavioural modifications [10,11]. One simple and

widely recommended preventive approach is the 20-20-20 rule, which advises taking a 20-second break to view an object 20 feet away every 20 minutes of screen exposure [12]. This technique aims to relax the ciliary muscles, maintain tear film stability, and reduce visual fatigue. Although clinical guidelines endorse the 20-20-20 rule, compliance is generally poor, and objective data regarding its effectiveness in reducing dry eye symptoms are limited [13]. Daily reminders or prompts via digital devices may enhance adherence and potentially improve ocular comfort, but evidence from controlled studies is scarce.

Understanding the impact of reminder-based behavioural interventions is particularly relevant in community and hospital settings where high screen exposure is common due to occupational or educational demands. Evaluating both subjective and objective parameters of dry eye, such as the Ocular Surface Disease Index (OSDI), Tear Break-Up Time (TBUT), and Schirmer's test, provides a comprehensive assessment of the intervention's efficacy. The study aimed to compare the outcomes of dry eye symptoms and tear film parameters in participants receiving daily reminders to practice the 20-20-20 vision rule versus those without reminders.

Materials and Methods

This prospective, randomized controlled study was conducted at the Community Health Centre, Kotkhai, Shimla, Himachal Pradesh, India, from May 2025 to August 2025. A total of 100 adult participants aged 18–50 years, reporting daily screen usage of at least 6 hours, were recruited. Inclusion criteria comprised individuals experiencing mild to moderate dry eye symptoms (Ocular Surface Disease Index [OSDI] ≥ 15) and no history of ocular surgery, active ocular infection, or systemic conditions affecting tear production. Participants using topical lubricants regularly, contact lenses, or medications affecting tear secretion were excluded. Informed written consent was obtained from all participants, and the study adhered to the Declaration of Helsinki and received approval from the institutional ethics committee. Participants were randomly assigned

into two equal groups ($n = 50$ each) using a computer-generated randomization sequence. Group A received daily electronic reminders via mobile phone to practice the 20-20-20 rule, which involves taking a 20-second break to view an object 20 feet away after every 20 minutes of screen time. Group B continued their routine activities without reminders. All participants were instructed to maintain their regular screen habits and avoid initiating any new dry eye treatments during the study period. The intervention lasted for one month.

Baseline assessments included demographic data, screen usage duration, and dry eye evaluation using standardized tools. Subjective symptoms were recorded using the Ocular Surface Disease Index (OSDI), tear film stability was assessed with Tear Break-Up Time (TBUT) using fluorescein dye, and tear secretion was measured with Schirmer's test without anesthesia. All assessments were performed by a single trained ophthalmologist to minimize inter-observer variability. Follow-up evaluations were conducted after one month under the same standardized conditions. Data were analyzed using SPSS v27. Continuous variables were expressed as mean $\pm$ standard deviation (SD), and categorical variables as frequency and percentage. Between-group comparisons for continuous variables were performed using the independent t-test. A p-value of <0.05 was considered statistically significant.

Results

The study included 100 participants, evenly divided into two groups of 50 each. Group A, who received daily reminders to practice the 20-20-20 rule, and Group B, who did not receive reminders, were comparable at baseline with respect to age, gender distribution, and daily screen time. The mean age was 35.2 ± 7.4 years in Group A and 34.7 ± 6.9 years in Group B. The gender distribution was similar in both groups (28/22 vs 30/20, M/F), and baseline screen time averaged 7.1 ± 1.5 hours/day in Group A compared to 7.3 ± 1.7 hours/day in Group B. These characteristics indicated no significant differences between the groups at baseline (Table 1).

Table 1: Participant Characteristics

Characteristic	Group A (n=50)	Group B (n=50)	p-value
Age (years)	35.2 ± 7.4	34.7 ± 6.9	0.68
Gender (M/F)	28/22	30/20	0.68
Baseline screen time (hrs/day)	7.1 ± 1.5	7.3 ± 1.7	0.54

Baseline Ocular Surface Disease Index (OSDI) scores were comparable between the groups (28.6 ± 6.5 vs 29.1 ± 6.2 , $p = 0.64$). After one month, participants in Group A demonstrated a significant reduction in OSDI scores to 18.2 ± 5.3 , whereas

Group B showed a more modest improvement to 25.7 ± 6.0 .

The mean difference of -7.5 between the groups was statistically significant ($p < 0.001$), suggesting that daily reminders for the 20-20-20 rule

substantially reduced subjective symptoms of dry eye (Table 2).

Table 2: Ocular Surface Disease Index (OSDI)

Time point	Group A (mean $\pm$ SD)	Group B (mean $\pm$ SD)	Mean Difference	p-value
Baseline	28.6 $\pm$ 6.5	29.1 $\pm$ 6.2	-0.5	0.64
1 month	18.2 $\pm$ 5.3	25.7 $\pm$ 6.0	-7.5	<0.001

Tear Break-Up Time (TBUT) measurements at baseline were similar between Group A and Group B (6.8 $\pm$ 1.2 s vs 6.7 $\pm$ 1.3 s, p = 0.71). At one month, TBUT significantly improved in Group A, reaching 9.3 $\pm$ 1.5 seconds, while Group B had a

smaller increase to 7.1 $\pm$ 1.4 seconds. The between-group mean difference of 2.2 seconds was statistically significant (p < 0.001), indicating improved tear film stability in participants receiving daily reminders (Table 3).

Table 3: Tear Break-Up Time (TBUT, seconds)

Time point	Group A (mean $\pm$ SD)	Group B (mean $\pm$ SD)	Mean Difference	p-value
Baseline	6.8 $\pm$ 1.2	6.7 $\pm$ 1.3	0.1	0.71
1 month	9.3 $\pm$ 1.5	7.1 $\pm$ 1.4	2.2	<0.001

Schirmer's test values, used to assess tear production, were comparable at baseline between Group A and Group B (12.1 $\pm$ 2.3 mm vs 12.4 $\pm$ 2.5 mm, p = 0.57). Following one month of intervention, Group A showed a significant increase to 15.8 $\pm$ 2.6 mm, whereas Group B increased only to 13.0 $\pm$ 2.4 mm. The mean difference of 2.8 mm between the groups was statistically significant (p < 0.001), indicating enhanced tear secretion in the reminder group (Table 4).

Table 4: Schirmer's Test (mm/5 min)

Time point	Group A (mean $\pm$ SD)	Group B (mean $\pm$ SD)	Mean Difference	p-value
Baseline	12.1 $\pm$ 2.3	12.4 $\pm$ 2.5	-0.3	0.57
1 month	15.8 $\pm$ 2.6	13.0 $\pm$ 2.4	2.8	<0.001

Discussion

Our study demonstrates that daily reminders to practice the 20-20-20 rule significantly alleviate both subjective and objective symptoms of digital eye strain (DES) in individuals with prolonged screen exposure. Participants who received reminders (Group A) exhibited a substantial reduction in Ocular Surface Disease Index (OSDI) scores, indicating improved self-reported ocular comfort. This aligns with findings from Alghamdi et al., who reported significant improvements in dry eye symptoms and tear film stability following educational interventions on the 20-20-20 rule [13].

Objective measures further support the efficacy of the 20-20-20 rule. Group A demonstrated significant improvements in Tear Break-Up Time (TBUT) and Schirmer's test values, reflecting enhanced tear film stability and increased tear secretion. These results are consistent with the study by Alghamdi et al. and Kumar S et al., which observed significant increases in TBUT following an educational intervention on the 20-20-20 rule [13,14].

The enhanced outcomes in Group A underscore the importance of adherence and compliance in preventive strategies for digital eye strain. While both groups experienced minor improvements, the magnitude of improvement was substantially higher in the reminder group. This highlights the

role of digital prompts in reinforcing adherence to preventive measures, a finding supported by Talens-Estarellles et al., who noted that reminders can effectively enhance compliance with the 20-20-20 rule [15].

Despite its strengths, our study has several limitations. The relatively short follow-up period of one month may not capture long-term adherence or sustained benefits. The reliance on self-reported compliance in Group A introduces the potential for recall bias. Additionally, the study was conducted in specific healthcare centers in Himachal Pradesh, which may limit the generalizability of the findings to broader populations with different screen habits or environmental conditions. Future studies with longer follow-up periods, objective monitoring of adherence, and diverse participant demographics are warranted to confirm and extend these findings.

Conclusion

Daily reminders to practice the 20-20-20 vision rule significantly reduce subjective symptoms of dry eye and improve objective tear film parameters in individuals with prolonged screen exposure. The intervention effectively enhances ocular comfort, tear film stability, and tear secretion, highlighting the value of simple behavioural strategies in the prevention and management of digital eye strain. Incorporating reminder-based adherence tools into daily routines may serve as an accessible and low-

cost approach to mitigate the growing burden of screen-related ocular discomfort.

References

1. Nakshine VS, Thute P, Khatib MN, et al. Increased Screen Time as a Cause of Declining Physical, Psychological Health, and Sleep Patterns: A Literary Review. *Cureus*. 2022;14(10):e30051.
2. Kaur K, Gurnani B, Nayak S, et al. Digital Eye Strain- A Comprehensive Review. *Ophthalmol Ther*. 2022; 11(5):1655-1680.
3. Uchino M, Schaumberg DA. Dry Eye Disease: Impact on Quality of Life and Vision. *Curr Ophthalmol Rep*. 2013;1(2):51-57.
4. Kwon J, Moghtader A, Kang C, et al. Overview of Dry Eye Disease for Primary Care Physicians. *Medicina (Kaunas)*. 2025; 61(3):460.
5. Wróbel-Dudzińska D, Osial N, Stępień PW, et al. Prevalence of Dry Eye Symptoms and Associated Risk Factors among University Students in Poland. *Int J Environ Res Public Health*. 2023;20(2):1313.
6. Tangmonkongvoragul C, Chokesuwattanaskul S, Khankaew C, et al. Prevalence of symptomatic dry eye disease with associated risk factors among medical students at Chiang Mai University due to increased screen time and stress during COVID-19 pandemic. *PLoS One*. 2022;17(3):e0265733.
7. Al-Mohtaseb Z, Schachter S, Shen Lee B, et al. The Relationship Between Dry Eye Disease and Digital Screen Use. *Clin Ophthalmol*. 2021; 15:3811-3820.
8. Pavel IA, Bogdanici CM, Donica VC, et al. Computer Vision Syndrome: An Ophthalmic Pathology of the Modern Era. *Medicina (Kaunas)*. 2023;59(2):412.
9. Guo OD LW, Akpek E. The negative effects of dry eye disease on quality of life and visual function. *Turk J Med Sci*. 2020;50(SI-2):1611-1615.
10. Wu WL, Chang SW. Characterization of Individuals with High-Frequency Artificial Tear Supplement Use. *J Clin Med*. 2025;14(8):2694.
11. Messmer EM. The pathophysiology, diagnosis, and treatment of dry eye disease. *Dtsch Arztebl Int*. 2015;112(5):71-81.
12. Datta S, Sehgal S, Bhattacharya B, et al. The 20/20/20 rule: Practicing pattern and associations with asthenopic symptoms. *Indian J Ophthalmol*. 2023;71(5):2071-2075.
13. Alghamdi WM, Alrasheed SH. Impact of an educational intervention using the 20/20/20 rule on Computer Vision Syndrome. *African Vision and Eye Health*. 2020;79(1):1-6.
14. Kumar S, Pandey H. Impact of 20-20-20 rule and daily reminders in relieving digital eye strain. *International Journal of Science & Healthcare Research*. 2024; 9(2): 339-351.
15. Talens-Estarellles C, Cerviño A, García-Lázaro S, et al. The effects of breaks on digital eye strain, dry eye and binocular vision: Testing the 20-20-20 rule. *Cont Lens Anterior Eye*. 2023;46(2):101744.