



The 20-20-20 Rule: An Initiative to Maintain Children's Eye Health Amidst the Widespread Use of Gadgets

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Published online: 17 December 2025

ABSTRACT

The widespread use of gadgets among children, including *santri* (Islamic boarding school students), contributes significantly to ocular health issues such as eye strain, dry eyes, and escalating myopia rates. Recognizing the limited awareness of excessive screen exposure risks, this community service intervention aimed to improve the knowledge and awareness of 38 *Santri Husada* (Student Health Cadres) at Assalafi Al-Fithrah Islamic Boarding School in Surabaya by implementing The 20-20-20 Rule. The methodology employed an interactive educational approach divided into three phases: preparation, implementation, and evaluation. The core procedure involved pre-test administration, interactive health sessions, practical simulation of the 20-20-20 Rule, educational leaflet distribution, and a post-test. Data were analyzed using the N-Gain score to measure effectiveness. Results demonstrated a significant knowledge improvement, with the average score increasing from 5.8 (pre-test) to 8.8 (post-test). N-Gain analysis indicated that 71.05% of participants achieved a high-improvement category, confirming the effectiveness of the interactive educational method. This activity successfully enhanced the *santri*'s health understanding and is deemed a potential sustainable health education model for boarding schools, although long-term monitoring is recommended.

Keywords: Eye Health; 20-20-20 Rule; Islamic Boarding School; Gadgets; Health Education

INTRODUCTION

The utilization of gadgets among children and adolescents has experienced a significant increase, particularly in the aftermath of the Covid-19 pandemic. This trend is evident not only in urban environments but also within residential educational institutions such as *pesantren* (Islamic boarding schools). Children are reported to spend an average of 4–6 hours daily engaging with gadgets, primarily for both recreational purposes and online learning (Pertiwi et al., 2018). This extended duration without adequate rest poses a risk of visual impairments, including myopia, dry eye syndrome, and eye strain (asthenopia) (Efendi et al., 2023). This phenomenon is also observed among *santri* at Assalafi Al-Fithrah Islamic Boarding School in Surabaya, where internet access and technology-based academic requirements drive the intensity of gadget usage. National data indicates that 79% of parents in Indonesia allow their children to use gadgets for non-educational activities, while only 21% impose restrictions on their use (Sya'diyah et al., 2021). International studies further corroborate similar findings, asserting that excessive screen exposure in children contributes significantly to the increasing prevalence of myopia and symptoms of Digital Eye Strain (DES) (Zheng et al., 2021; Al-Mohtaseb et al., 2021).

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Consequently, the urgency for education-based ocular health intervention becomes increasingly evident.

One of the widely recommended preventive theories is the 20-20-20 Rule, which involves resting the eyes every 20 minutes by looking at an object 20 feet away for 20 seconds. This rule has been proven effective in alleviating symptoms of asthenopia (eye strain) resulting from near-visual activity (Datta et al., 2023). However, the literature indicates that the adherence rate to this rule remains low among children and adolescents due to insufficient socialization, supervision, and understanding (Waang et al., 2024). Based on this review, a critical gap exists in ocular health practice within *pesantren* environments. Although *santri* are highly vulnerable to the risk of visual impairment due to the intensity of gadget-based learning, there are currently no systematic programs introducing and institutionalizing the 20-20-20 Rule in their environment. The lack of education-based intervention in religious educational institutions potentially exposes *santri* to long-term problems, such as an increase in myopia cases and decreased visual quality at a young age.

Therefore, the central problems investigated in this community service activity are the low awareness among *santri* regarding the negative impact of excessive gadget use on ocular health, the lack of understanding concerning the application of the 20-20-20 Rule, and the limited access to eye health information within the *pesantren* environment. The objective of this activity is to enhance the *santri*'s awareness and knowledge about the importance of maintaining eye health in the digital era, specifically through the implementation of the 20-20-20 Rule. Through interactive educational intervention, the *santri* are expected to internalize healthy digital behavior and become agents of change in fostering a *pesantren* environment that is more conscious of ocular health.

LITERATURE OR CONCEPTUAL REVIEW

The Increasing Intensity of Gadget Usage

In the last decade, the utilization of gadgets (smartphones, tablets, and laptops) among children and adolescents has experienced an exponential increase. This surge was exacerbated by the onset of the COVID-19 pandemic, which necessitated the massive adoption of online learning (Pertiwi et al., 2018; Sya'diyah et al., 2021). The intensity of children's daily screen time often reaches an average of 4 to 6 hours, exceeding the screen time limits recommended by health organizations.

Visual Impairment Resulting from Prolonged Near-Visual Activity

Prolonged near-visual activity without rest triggers a series of ocular health problems. The most commonly reported disorders include:

1. Asthenopia (Eye Strain)
Common symptoms such as watery eyes, headaches, and blurred vision, which are caused by the continuous overexertion of the ocular accommodative muscles (Efendi et al., 2023).
2. Dry Eye Syndrome
The reduced blinking frequency while staring at a screen for extended periods causes faster tear evaporation.
3. Myopia (Nearsightedness)
International studies show a strong correlation between excessive screen exposure and the increasing prevalence of myopia in the pediatric population (Zheng et al., 2021; Al-Mohtaseb et al., 2021). This phenomenon, also known as Digital Eye Strain (DES), constitutes a pressing public health concern.

The 20-20-20 Rule: Definition and Practical Rationale

The 20-20-20 Rule suggests that for every 20 minutes of screen use, individuals should pause and look at an object located 20 feet (approximately 6 meters) away for 20 seconds. The objectives are twofold: to provide relaxation for the ocular accommodative muscles and to encourage blinking, thus promoting the rehydration of the eye surface. Ocular professional organizations frequently recommend this rule as a simple strategy to mitigate the symptoms of Digital Eye Strain (DES) (Datta et al., 2023).

Clinical Effectiveness of the 20-20-20 Rule

Clinical studies demonstrate that the consistent application of the 20-20-20 Rule is proven effective in alleviating asthenopia symptoms and enhancing visual comfort (Datta et al., 2023). This rule serves as an easily adoptable behavioral intervention, establishing it as an ideal and non-pharmacological preventive solution for the general population.

Intervention Gap and Relevance in the Pesantren Environment

Despite its proven effectiveness, the adherence rate to the 20-20-20 Rule remains low among children and adolescents (Waang et al., 2024). The primary constraints identified include insufficient socialization, inadequate supervision from adults/educators, and minimal understanding of its long-term benefits.

Based on the literature review, a critical gap exists in ocular health interventions within residential educational institutions such as *pesantren* (Islamic boarding schools). *Santri* are in a highly vulnerable state due to a combination of factors: the high intensity of gadget-based learning, and the lack of systematic and institutionalized eye health education programs in the boarding school environment (Sari et al., 2024).

This gap creates an urgency to implement education-based intervention programs. The community service activity, which targets health cadres (*Santri Husada*) and focuses on practical training of the 20-20-20 Rule, aims to bridge this knowledge and adherence gap. By empowering *santri* as agents of change, this program is expected to foster a sustainable culture of eye health prevention within the *pesantren* environment (Iqlimah et al., 2020).

MATERIALS AND METHODS

This community service activity utilized a health education methodology, combining lectures, interactive discussions, and simple training sessions directed at the *Santri Husada* (Student Health Cadres). The primary objective of the activity was to enhance public knowledge, particularly among adolescents, regarding ocular health, the prevention of refractive errors, and the significance of early detection of visual impairment.

The activity was conducted at Assalafi Al-Fithrah Islamic Boarding School, Surabaya. The site selection was based on the high intensity of gadget usage by the *santri* for both online learning and recreational activities, as well as the support provided by the *pesantren* management in facilitating the implementation of the activity. The primary participants were the *Santri Husada* (Student Health Cadres), comprising a total of 38 selected students. This group was chosen with the objective that they would not only receive the education but also function as agents of change, disseminating eye health information throughout the boarding school environment.

This community service activity utilized a health education methodology, combining interactive lectures, discussions, and a simple training session on the application of the 20-20-20 Rule. The primary goal was to enhance the knowledge and awareness of *santri* at Assalafi Al-Fithrah Islamic Boarding School in Surabaya regarding ocular health, specifically in preventing visual impairment resulting from excessive gadget use. The target group for the activity was 30 *Santri Husada* (Student Health Cadres), who were selected as health agents not only to comprehend the material but also to disseminate the information throughout the boarding school environment.

The implementation of the activity was executed through three main phases: preparation, implementation, and evaluation. During the preparation phase, the executing team coordinated with the *pesantren* management to determine the schedule and technical aspects of the activity, followed by an internal Focus Group Discussion (FGD) to develop the activity plan. This phase also included the preparation of educational media, consisting of a PowerPoint presentation, leaflets, and booklets containing concise information on ocular health and the 20-20-20 Rule.

The implementation phase commenced with an opening session and program introduction to the participants. Subsequently, the *santri* were administered a pre-test to measure their baseline knowledge concerning ocular health and the impact of gadget use. The counseling session was then delivered by the community service team using an interactive lecture method for 40 minutes, covering the dangers of excessive gadget use, the signs and symptoms of eye strain, and prevention strategies through the application of the 20-20-20 Rule. Following the lecture, a 20-minute practical simulation of the 20-20-20 Rule was conducted directly to ensure that participants comprehended the concept not only theoretically but also for daily practice. To reinforce understanding, participants also received educational leaflets and booklets. The activity concluded with the administration of a post-test for the evaluation of knowledge enhancement.

In the evaluation phase, the pre-test and post-test data were analyzed by comparing the average scores of the participants to observe the enhancement of comprehension following the activity. The N-Gain Score analysis was utilized to assess the effectiveness of the counseling in improving individual knowledge. Furthermore, field observation was conducted to evaluate the *santri's* responses, participation, and readiness to implement the 20-20-20 habit within the *pesantren* environment.

RESULTS AND DISCUSSION

The community service activity conducted at Assalafi Al-Fithrah Islamic Boarding School, Surabaya, garnered a highly positive response from both the participants and the *pesantren* management. The *Santri Husada*, who were the primary targets, demonstrated high enthusiasm throughout the entire series of activities, including the pre-test, interactive counseling sessions, and the simulation of the 20-20-20 Rule application. Generally, the results obtained illustrate an enhancement in the *santri's* knowledge and awareness regarding the importance of maintaining ocular health, particularly in relation to the intensive use of gadgets in their daily *pesantren* life.

Beyond the quantitative measurement through the comparison of pre-test and post-test scores, the results of the activity are also supported by qualitative findings, specifically field observations which indicated the active engagement of participants in discussions and their readiness to implement the 20-20-20 habit. The *pesantren* management also expressed full support for the sustainability of this program, suggesting that the activity does not merely conclude at the educational stage but also creates opportunities for the internalization of healthy ocular behavior within the boarding school environment in a more sustainable manner. Table 1 will present the average pre-test and post-test results of the participants.

Table 1. Average Pre-test and Post-test Results on the 20-20-20 Rule Among Participants

Mean	Min	Max
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Pre-test	5,8	0	9
Post-test	8,8	2	10

Based on the analysis of the average pre-test and post-test scores from 38 participants, a significant increase in knowledge was observed. The average pre-test score of 5.8 increased to 8.8 in the post-test, showing a difference (improvement) of 3 points. This demonstrates the effectiveness of the counseling intervention in enhancing the participants' comprehension of the material provided. The score distribution of the pre-test and post-test for each individual participant is illustrated in Figure 1, which shows a consistent upward trend in scores.

Nilai Pre-Post Test "Gerakan 20-20-20" pada Santri Husada di PP. Assalafi Al-Fitrah



Figure 1. Distribution of Pre-test and Post-test Scores for Each Individual Participant in the 20-20-20 Rule Counseling at PP. Assalafi Al-Fithrah, Surabaya (n=38)

From the bar chart, it is evident that 21 participants achieved a perfect post-test score (100), specifically participant numbers: 3, 8, 10, 12, 13, 16, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 33, 34, 35, 36, and 37. This indicates that the majority of participants achieved a score of ≥ 90 in the post-test, signifying a significant increase in comprehension following the educational intervention. Generally, almost all participants experienced a score improvement compared to the pre-test, with the average post-test value being substantially higher. Figure 2 will present the N-Gain Score distribution data to assess the effectiveness of the method utilized in the counseling for each individual participant.

N-Gain Score Tiap Peserta

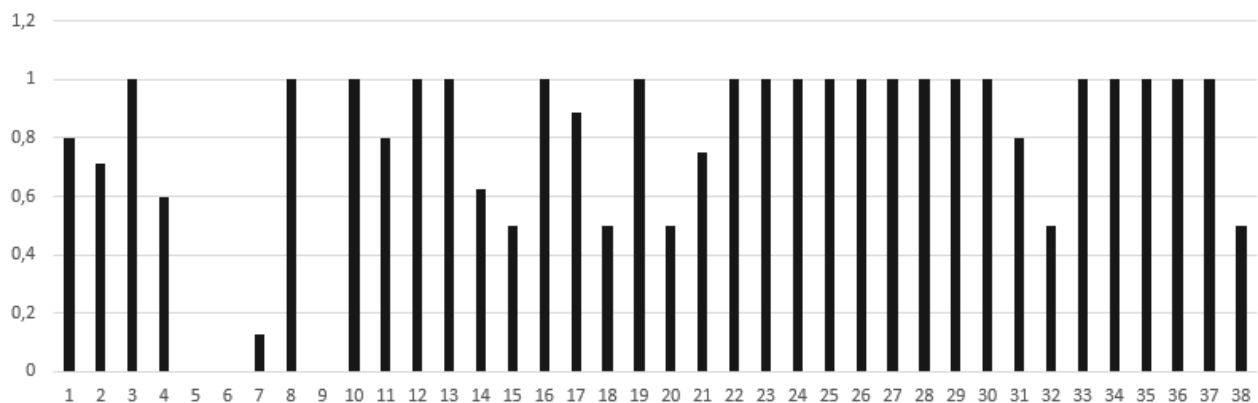


Figure 2. Distribution of N-Gain Score for Each Participant in the 20-20-20 Rule Counseling

Based on the bar chart titled 'Distribution of N-Gain Score for Each Participant,' variations in the achievement of knowledge enhancement were observed following the 20-20-20 Rule education. Referring to the Hake (1999) criteria, the N-Gain categories are divided into three: low (<0.3), medium ($0.3-0.7$), and high ($>0.7-1.0$). Participant numbers 3, 8, 10, 12, 13, 16, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 33, 34, 35, 36, and 37 (a total of 21 individuals) achieved an N-Gain score of 1.0. Additionally, 6 participants recorded N-Gain scores above 0.7, resulting in a total of 27 participants categorized as achieving high improvement. This signifies that the majority of participants

experienced highly effective enhancement in comprehension. However, several participants recorded lower N-Gain scores, such as participants 4, 14, 15, 18, 20, 32, and 38 (a total of 7 individuals), who fell into the medium improvement category ($0.3 < \text{N-Gain} \leq 0.7$). Furthermore, 4 participants exhibited very low N-Gain scores (< 0.3), which indicates that the material may not have been fully absorbed or that an alternative approach is necessary for these participants.

DISCUSSION

The 20-20-20 Rule represents a simple yet effective strategy for maintaining ocular health in the digital era, involving resting the eyes every 20 minutes by looking at an object 20 feet away for 20 seconds. For *santri* (Islamic boarding school students), the application of this rule is highly relevant given the high exposure to gadgets for both learning activities and recreation. Reading religious texts (kitab) under suboptimal lighting conditions, coupled with prolonged, uninterrupted gadget use, can elevate the risk of myopia, asthenopia (eye strain), and dry eye syndrome. Consequently, education regarding the 20-20-20 Rule is crucial to ensure that *santri* develop healthy digital habits that can minimize the risk of visual impairment early on (Efendi et al., 2023; Al-Mohtaseb et al., 2021).

The results of this activity are consistent with various studies demonstrating that community-based educational interventions are capable of enhancing knowledge and practices related to eye health prevention. The research by Datta et al. (2023) substantiated that the application of the 20-20-20 Rule correlates with a reduction in asthenopia symptoms among individuals engaging in intensive visual activity. Other studies affirm that excessive screen exposure increases the prevalence of myopia in children and adolescents, while interventions such as screen time regulation and regular rest can mitigate this risk (Zheng et al., 2021). Furthermore, school-based screening programs in Indonesia have also proven effective in raising students' awareness regarding the early detection of refractive errors (Rini et al., 2023). These findings reinforce the outcome of this community service project, which showed an enhancement in the *santri*'s comprehension after receiving education and direct practice concerning the 20-20-20 Rule.

Despite the positive results obtained, this activity possesses several limitations. Firstly, the number of participants was restricted to the *Santri Husada* group, meaning the direct impact has not yet reached all *santri* within the *pesantren*. Secondly, the evaluation conducted was limited to knowledge measurement through pre-test and post-test scores, lacking long-term follow-up to assess the consistency of the 20-20-20 habit application in daily life. Furthermore, time constraints prevented the intervention from including comprehensive visual acuity examinations. Therefore, future scope for improvement includes broadening the participant target, integrating the program into the *pesantren*'s routine activities, and collaborating with eye health professionals to conduct continuous examination and monitoring. Through these steps, it is expected that the 20-20-20 Rule will not merely remain knowledge but truly become a culture of ocular health within the *pesantren* environment. Selected documentation of the community service outcomes is presented in Figure 3.



Figure 3. (a) Administration of the pre-test prior to the educational material delivery by santri of PP. Assalafi Al-Fithrah, Surabaya; (b) Ocular health examination.

CONCLUSIONS

The community service activity at Assalafi Al-Fithrah Islamic Boarding School in Surabaya proved effective in enhancing the knowledge and awareness of *Santri Husada* regarding the importance of maintaining ocular health through the application of the 20-20-20 Rule. This is reflected by the significant increase in the average score from the pre-test (5.8) to the post-test (8.8), as well as the high N-Gain achievement where 27 participants (71.05%) scored >0.7 , indicating that the majority of participants fell into the high-improvement category. In addition to the quantitative results, the active engagement of *santri* in discussions, simulations, and their enthusiasm for adopting healthy digital habits further supports the success of this activity.

The 20-20-20 Rule is highly relevant for implementation in *pesantren*, given the high gadget usage and intensive visual activity that pose risks to ocular health. Nevertheless, this activity still possesses limitations, including the absence of long-term evaluation and a lack of accompanying visual acuity examinations. Therefore, a follow-up action is necessary, consisting of broadening the target audience, integrating the program into routine *pesantren* activities, and collaborating with eye health professionals so that the 20-20-20 Rule can be internalized as a sustainable healthy culture within the boarding school environment.

Acknowledgments

The authors extend their sincere gratitude to the Institute for Research and Community Service (LPPM) of UNUSA, as well as the Research and Community Service Unit (UPPM) of the Faculty of Medicine, UNUSA, for their support, coordination, and facilitation in the execution of this community service activity. Appreciation is also extended to the Assalafi Al-Fithrah Islamic Boarding School, Surabaya, for granting permission, providing support, and offering cooperation, which ensured the successful execution of the activity. Thanks are also directed to the Leadership of the Faculty of Medicine UNUSA, the lecturers, and the students for their contributions, technical assistance, and active participation, which enabled this activity to proceed smoothly and successfully.

Conflict of Interests

The authors declared that no potential conflicts of interest with respect to the authorship and publication of this article.

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