

THE EFFECT OF INFOGRAPHICS ABOUT SMARTPHONE USAGE ON EYE HEALTH AWARENESS AMONG ELEMENTARY SCHOOL CHILDREN AT SD NEGERI WIRADADI BANYUMAS

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ABSTRACT

Excessive use of smartphones among elementary school children has been shown to negatively impact eye health, leading to issues such as eye strain, dry eyes, and reduced visual acuity. This study aimed to assess the effect of infographic media about smartphone usage on sixth-grade students' knowledge of eye health at SD Negeri Wiradadi Banyumas. A quantitative approach using a one-group pre-test and post-test design was employed. The sample consisted of 46 students, selected through purposive sampling. The research instrument was a questionnaire administered both before and after the intervention. The results, analyzed using the Wilcoxon test, showed a significant increase in student knowledge, with a p-value of 0.05. This indicates that infographic media effectively enhanced students' understanding of eye health. Infographic posters are a useful and engaging tool for health education, providing an easily accessible method for children to learn about the importance of eye care, thus contributing to improved awareness and habits regarding smartphone use and eye health.

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1. INTRODUCTION

The growth period of school-aged children requires special attention due to the risks associated with conditions that can disrupt their physical and cognitive development (Fridalni et al., 2024). This stage, often marked by rapid growth and development, is crucial for children's long-term health and well-being (Hijriati, 2021). However, various health issues such as nutritional imbalances, dental health problems, parasitic infections, and contagious diseases related to personal hygiene practices need to be addressed (Fridalni, 2024). Poor nutrition and visual impairment are also major concerns in children's developmental health (Syukaisih et al., 2022). One significant factor contributing to visual health problems is the prolonged use of electronic devices like smartphones (Wati, 2021).

A smartphone, a type of advanced mobile phone, has become a popular gadget among children, often used for playing online games. Unfortunately, excessive screen time, poor posture, and inadequate lighting during use can all contribute to the deterioration of visual acuity in children (Dwiana et al., 2021a).

The symptoms associated with visual impairments, such as blurred vision, dry eyes, fatigue, and eye pain, are commonly reported among children who spend prolonged hours on their devices (Syarli & Wahyudi, 2024). Research has shown that daily exposure to electronic devices has a direct impact on the development of dry eye syndrome in children, although the intensity of light emitted by these devices does not appear to have a significant cumulative effect on eye dryness (Patadungan et al., 2022).

Dry eye syndrome is a condition in which the eyes do not receive enough lubrication from tears. Symptoms include redness, a gritty or sandy feeling in the eyes, sensitivity to light, blurred vision, and increased fatigue, which worsens with prolonged screen time (Sindrom Mata Kering, 2023). If left untreated, this condition can lead to serious complications such as eye infections, conjunctivitis, corneal damage, and vision impairment. Studies indicate that dry eye syndrome is prevalent in about 25% of the population, with a reported 93.2% prevalence in Asia as of 2012. In Indonesia, dry eye syndrome was found in 27.5% of the population in 2007, and more than 27% of individuals on the island of Sumatra were affected (Chairiah et al., 2022).

Globally, around 165 million children suffer from refractive errors, with 3.6 million children in Indonesia experiencing visual impairments (Siti Nadia Tarmizi, 2024). In Central Java, the prevalence of severe low vision among 5-year-olds is approximately 1.1%, and studies conducted among children aged 6-11 show a prevalence of 2.32% (Limijadi et al., 2020). At the Purwokerto Eye Hospital (RSKM), 1,056 children aged 7-13 years were diagnosed with eye problems in 2023, with common conditions including hypermetropia, myopia, astigmatism, and amblyopia. Additionally, 1,000 cases of myopia were reported in 5,000 students screened across several schools in Sokaraja 1 health center, with the majority of cases occurring in students of junior high and high school age. At SD Negeri Wiradadi, 106 cases of myopia were recorded among 516 students, ranking it fifth among elementary schools in the Sokaraja 1 area.

To address the growing concern of visual health issues resulting from intense screen exposure, one effective solution is the use of engaging and informative educational media, such as infographics (Kesehatan et al., 2023). Visual media can capture children's attention, making it easier for them to focus during educational activities. Infographic posters, which combine appealing images, text, and objects, are especially useful in simplifying complex concepts, making learning more enjoyable (Lusiana et al., 2021).

A preliminary study conducted at SD Negeri Wiradadi on October 10, 2024, surveyed 31 fourth-grade students who owned gadgets. The results showed that 17 students complained of dry eyes, 11 reported neck pain, and 3 students did not experience any symptoms. Notably, none of the students had received any education regarding the proper use of gadgets and eye health.

The proposed study at SD Negeri Wiradadi, Sokaraja District, Banyumas Regency, seeks to investigate the impact of infographic-based education on students' knowledge about eye health, particularly in relation to the use of electronic devices. The aim is to enhance students' understanding of the importance of using gadgets responsibly and promote healthier habits regarding screen time. This research is vital in encouraging responsible gadget use and addressing the visual health challenges faced by school-aged children.

2. RESEARCH METHOD

This study employed a pre-experimental design using a one-group pre-test and post-test approach. The purpose of the study was to assess the impact of infographic media on elementary school children's knowledge of eye health related to smartphone use.

The study was conducted at SD Negeri Wiradadi, with 46 sixth-grade students selected using purposive sampling. The inclusion criteria included students who were willing to participate, owned a smartphone, and were able to read and write. A pre-test questionnaire on eye health knowledge was administered before the intervention, followed by an educational session using infographic posters, and a post-test was administered after the intervention.

The sample size was determined using Slovin's formula:

$$n = \frac{N}{1 + N \cdot e^2}$$

Where n is the sample size, N is the total population, and e is the margin of error (10%). Based on this, a sample of 46 students was deemed sufficient for the study. The data collected from the pre-test and post-test were analyzed using the Wilcoxon signed-rank test to evaluate the significant difference in students' knowledge before and after the intervention. Statistical analysis was performed using SPSS software, and a p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Ethics Research Committee at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto. Informed consent was obtained from both students and their parents, ensuring confidentiality and voluntary participation.

3. RESULT AND DISCUSSIONS (Font 10, Times New Roman, Spacing 1.15)

3.1. Univariate Analysis

Data collection was conducted at SD Negeri Wiradadi, Sokaraja District, Banyumas Regency. A total of 46 respondents were included, with the study characteristics covering age, gender, grade, and eye examination history. The frequency distribution results of the respondent characteristics are presented as follows:

Table 1. Frequency Distribution of Respondent Characteristics

Respondent Characteristic	N	Percentage (%)
Age		
11 Years	33	71.7
12 Years	13	28.3
Total	46	100
Gender		
Male	25	54.3
Female	21	45.7
Total	46	100
Eye Examination History		
Ever had eye exam	12	26.1
Never had eye exam	34	73.9
Total	46	100

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Based on Table 1, the 46 respondents from SD Negeri Wiradadi, Sokaraja District, Banyumas Regency, the majority of the 6th-grade students were aged 11 years, with 33 children (71.7%). Regarding eye examination history, most students (34 children, 73.9%) had never had an eye exam. Tabel

2. Distribution of Children's Knowledge Level About Eye Health

Variable	N		%	
	(Pretest)	(Posttest)		
Knowledge				
Good	16	46	34,8	100

Sufficient	30	65,2	-	-
Poor	-	-	-	-
Total	46	100	46	100

Based on Table 2, before the education was provided, the majority of respondents had a sufficient level of knowledge, with 30 respondents (65.2%). After the education, the knowledge level increased to the good category, with all 46 respondents (100%) achieving a good level of knowledge.

3.2. Bivariate Analysis

Bivariate Analysis was conducted to determine whether there was a significant difference in the average knowledge level of children about eye health before and after receiving education using infographic poster media. Before performing the bivariate analysis, a normality test was conducted using the Shapiro-Wilk test to determine if the data was normally distributed. The results of the study showed a significance value for the pretest of 0.075 and for the posttest of 0.218, indicating that the data is normally distributed. Following this, a compare mean test using the paired sample t-test was performed to determine the significant comparison between the pretest and posttest. Below are the normality test results for each variable.

3. Normality Test				
Tests Of Normality				
Shapiro-Wilk				
		Statistic	N	Sig
Hasil	Pretest Knowledge	.955	46	.075
	Posttest Knowledge	.967	46	.218

Based on the Shapiro-Wilk test, the pretest and posttest values are normally distributed. Since all data is normally distributed, a compare mean test was performed using the Paired-sample T-test.

4. Effect of Educational Poster Media on Children's Knowledge About Eye Health							
Variable	N	Mean	Standard Deviasi	Comparison	t	df	p-value
Pretest	46	78,207	4,84				
Posttest	46	84,40	5,03	-6,2	-7,944	45	.001

Based on Table 4, the average knowledge level increased by 6.2 points. After conducting the t-test to compare the conditions before and after education with the infographic poster media on eye health for elementary school children, a significant result was obtained with a p-value of 0.001 (< 0.05) and a t-value of -7.944. This result is statistically significant, meaning there is a significant difference between before and after the education. Therefore, H₀ is rejected and H_a is accepted. It can be concluded that the infographic educational poster media significantly influences the improvement of children's knowledge about eye health.

4. DISCUSSION

Based on Table 4.1, the respondents in this study were children aged between eleven and twelve years, with the majority belonging to the eleven-year-old group, indicating that this age group was more dominant. As noted by B. S. et al. (2020), age influences knowledge and health awareness, as cognitive abilities and thinking patterns develop with age, enabling individuals to acquire more knowledge.

The data also revealed that most respondents were male, with a slightly higher proportion of males compared to females. Gender is determined during the eighth week of pregnancy (Artaria, 2016). Additionally, the data showed that most respondents did not have the habit of having regular eye check-ups, with only a small proportion having undergone an eye examination previously. Regular eye examinations are vital for detecting visual impairments early, and it is crucial to perform these checks at least once a year (Simarmata et al., 2023). The World Health Organization (WHO) also recommends vision screening as an efficient preventive measure, especially for individuals at high risk.

This study demonstrated a significant improvement in the respondents' knowledge after receiving eye health education through infographic posters. Initially, the children's knowledge levels were measured through a pretest, yielding an average score of 78.20 with a standard deviation of 4.8. After one week of education using infographic posters, the posttest results showed a significant improvement, with the average score rising to 84.40 with a standard deviation of 5.30.

One of the contributing factors to eye problems, especially in children, is the use of gadgets. Limiting gadget usage is particularly important during the growth period, with a focus on regulating usage time, distance, symptoms, and preventive methods for eye health issues. The study demonstrated that using educational posters, which are visually engaging and easy to understand, was effective in increasing children's knowledge about the importance of regular eye examinations.

This study also found a significant effect of education on eye health, including symptoms of eye problems, foods beneficial for eye health, and eye treatment, using infographic posters. The statistical test, employing the compare means method, showed a p-value of 0.001 ($p < 0.05$), indicating that the hypothesis H_a was accepted and H_o was rejected. This result confirms that education using infographic posters significantly improved children's knowledge of eye health.

The effectiveness of posters in enhancing knowledge is further supported by previous studies. For instance, Pratiwi et al. (2024) showed that education through posters had a more significant impact than other media on improving knowledge and attitudes in elderly participants. Similarly, Park & Ahn (2022) demonstrated that health education programs using posters significantly improved eye health knowledge and behavior in middle school students. This study reinforces those findings by focusing on elementary school children and using interactive infographic posters tailored to their age group. Consequently, this research not only supports previous studies but also expands the use of visual media (infographic posters) in health education across various age groups, with significant results, as evidenced by the p-value of 0.001.

The effectiveness of posters as a promotional tool largely depends on the quality of their design. A well-designed poster, placed in a strategic location, is more effective at attracting attention than text-only advertisements. Koniah et al. (2025) pointed out that posters combining images and text have cognitive advantages, enhancing the audience's retention of the message. Additionally, research by Natasha et al. (2021) showed that education using posters is most effective when conducted twice, with one-week intervals between sessions.

This study, however, has some limitations. One limitation was the use of a WhatsApp group to communicate information regarding the posttest schedule and distribute the eye health education posters three times a week. The researcher lacked an accurate monitoring mechanism, as they could only track the respondents' understanding of the material through the WhatsApp group. Moreover, the researcher did not have access to monitor whether parents ensured the respondents studied the posters, as the teacher did not provide access for direct monitoring. This limited the ability to measure the participants' adherence to the education and their direct involvement in the learning process.

5. CONCLUSION AND RECOMMENDATION

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Based on the research objectives and the results of the data analysis regarding the influence of infographic poster media on improving children's knowledge about eye health due to gadget usage, the following conclusions can be drawn:

1. Characteristics of the Respondents: The average age of the children was 11 years, with a total of 33 respondents, predominantly male (23 respondents). Out of the respondents, 12 had a history of eye examinations, while 34 respondents had never undergone an eye examination.
2. Knowledge Scores Before and After Education: Before the education, the average knowledge score of the children was 78.20. After the education, the average score increased to 84.40, showing an improvement of 6.2 points.
3. Impact of Infographic Poster Education: The results show that there is a significant effect of infographic poster media on the knowledge of eye health in elementary school children, with a p-value of 0.001 ($p < 0.05$), indicating a statistically significant improvement in their knowledge.

The findings from this study highlight the importance of increasing awareness about eye health, particularly regarding the impact of gadget usage. For the author, it is hoped that this research contributes to a deeper understanding of eye health and promotes responsible use of gadgets among children. For the respondents, this study offers valuable insights that can help improve their knowledge of eye health, encouraging them to make more informed decisions about gadget usage and take better care of their eyes.

Looking ahead, future research could build upon this study by conducting long-term evaluations to examine the lasting effects of infographic poster media on children's eye health. Such research could further explore how ongoing education influences children's eye health habits over time and whether similar interventions can be applied to other health topics.

Acknowledgement

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