

The Effect Of Hydration Education Using Animated Videos On Changes In Water Consumption Habits Among Elementary School Students

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Abstract

Introduction: Hydration is an important physiological need in maintaining body balance and cognitive function in school-age children. Inadequate fluid intake may increase the risk of mild dehydration which affects concentration and learning readiness. Hydration education using animated video is considered effective because it combines visual and audio elements that attract children's attention. This study aimed to analyze the effect of hydration education using animated video on changes in drinking water behavior among elementary school students.

Methods: This study used a quantitative pre-experimental design with a one-group pretest-posttest approach. The study population consisted of fifth and sixth-grade students, with 60 respondents selected using proportional random sampling techniques. The independent variable was hydration education using animated video media, while the dependent variable was drinking water habit behavior. Data were collected using the Fluid Intake and Hydration Questionnaire (FIHQ). Statistical analysis was performed using the Wilcoxon Signed Rank Test with a significance level of $\alpha = 0.05$.

Results: The results showed that before intervention, most respondents had moderate drinking water behavior. After hydration education using animated video, respondents with good drinking water behavior increased. Statistical analysis showed $p\text{-value} = 0.000$ ($p < 0.05$), indicating a significant effect of hydration education using animated video on changes in drinking water behavior among elementary school students.

Conclusions: Hydration education using animated video significantly improved drinking water habits among elementary school students. Animated educational media can be used as an innovative health promotion strategy to encourage healthy hydration behavior in school-age children.

Keywords: Drinking behavior, hydration, student, video animation)

Introduction

Hydration is a key factor in maintaining the body's physiological balance and supporting cognitive function, particularly in school-aged children. Insufficient fluid intake can lead to mild dehydration, which often goes unnoticed but can result in reduced concentration, memory, and academic performance at school. Several studies indicate that inadequate hydration is associated with reduced cognitive function and attention in children (Drozdowska et al., 2020; Ibrahim, 2021).

Elementary school-aged children are a group vulnerable to hydration problems due to their immature drinking habits. Research shows that insufficient fluid intake is associated with

poor hydration status and impacts overall health (Saftarina & Fauziah, 2023). Furthermore, mild dehydration is also known to affect students' cognitive performance and learning abilities in school (Drozdowska et al., 2020; Oktavianto et al., 2025).

Empirical evidence suggests that rates of mild dehydration are quite high among Indonesian children and adolescents. A study by Saftarina at an elementary school in Bandar Lampung reported that although 69.6% of students appeared to have adequate fluid intake based on a questionnaire, objective examination revealed 60.9% exhibited signs of dehydration through urine ultrasound evaluation, confirming a discrepancy between perceived intake and actual hydration status (Saftarina & Fauziah, 2023). Consistent with these findings, national hydration survey reports, such as the Indonesian Regional Hydration Study (THIRST), also recorded rates of mild dehydration among Indonesian adolescents at around 46%–49.5%, indicating a widespread problem in the school-age group. Several additional studies have noted that the average total fluid intake (TFI) of Indonesian children is around 2.1 L/day, which often falls short of the recommended daily fluid intake (Nurfrida & Lestari, 2019).

Globally, the issue of hydration in children is gaining increasing attention due to its significant impact on academic achievement. Research in Germany showed that drinking up to 1,000 mL of water in the morning was associated with improved short-term memory in elementary school children (Drozdowska et al., 2020; Putri et al., 2025).

A preliminary study conducted at Dabasah 5 Elementary School in Bondowoso found that some students lacked good water drinking habits, such as rarely carrying a water bottle, preferring sweetened drinks, and not understanding the importance of meeting daily fluid needs. This situation indicates the need for effective educational interventions to improve water drinking behavior. SDN Dabasah 5 Bondowoso was selected as the research site because it provided an appropriate population of elementary school students to evaluate the effectiveness of animation video–based hydration education on drinking water habits. The school also offered a supportive environment and accessibility for implementing the educational intervention and assessing changes in students' hydration-related knowledge, attitudes, and drinking behaviors. Based on this description, this study aims to analyze the effect of hydration education using animated videos on changes in water drinking behavior in elementary school students.

Methods

This study used a pre-experimental design with a one-group pretest-posttest approach. The aim was to determine the effect of hydration education using animated video media on

changes in water drinking behavior among elementary school students. The study was conducted at fourth and fifth grade in Dabasah 5 Elementary School, Bondowoso, with a population of 70 students. A sample of 60 respondents was selected using proportional random sampling in accordance with established inclusion and exclusion criteria. Students in these grades have sufficient reading, comprehension, and communication skills to complete the study questionnaires accurately and are more capable of adopting and demonstrating changes in daily drinking water habits compared with younger elementary school students.

The inclusion criteria for this study were characteristics that prospective participants must possess in order to be included in the research process. Participants who met the inclusion criteria were fifth and sixth grade students actively enrolled at Dabasah 5 Elementary School. Furthermore, students must be able to read and understand simple instructions in Indonesian, enabling them to effectively participate in all research activities. Student presence during data collection was also essential to ensure direct participation in the intervention and measurements. Ethical aspects were also considered in this study, with each participant obtaining written consent from a parent or guardian through an informed consent form before participation.

Meanwhile, exclusion criteria are characteristics that prevent potential participants from participating in the study even if they meet some or all of the inclusion criteria (Soekidjo Notoatmodjo, 2020). In this study, excluded participants were students with visual impairments or cognitive impairments that could hinder the process of receiving information, particularly through the visual-based learning media used in the study. Furthermore, students who refused to participate, even after obtaining permission from their parents or guardians, were also excluded from the study.

The independent variable in this study was hydration education using animated videos, while the dependent variable was water drinking behavior. The instrument used to measure water drinking behavior was the Fluid Intake and Hydration Questionnaire (FIHQ) developed by Saftarina & Fauziah (2023). The research procedure was carried out in several stages: a pretest to determine water drinking behavior before the intervention, followed by hydration education using animated videos. The video was developed by author. The video education was conducted over three sessions. In the first session, the video explained definition of hydration, the importance of hydration, and the signs of hydration were discussed. The second session described about the benefits of water for the body and the signs of dehydration were discussed. In the final session, the video talked about daily drinking needs and water drinking habits were

discussed and simulated. A post-test was then conducted after the intervention to determine any changes.

Data analysis included univariate analysis to determine data distribution, including age and class, and bivariate analysis using the Wilcoxon Signed Rank Test because the data were not normally distributed. The significance level used was $\alpha = 0.05$. This study adhered to research ethics, including informed consent, data confidentiality, and the principles of beneficence and non-maleficence. This research has passed the ethics approval from Dr. Soebandi University under ethics number (282/KEPK/UDS/III/2026).

Results

This study was conducted on 60 student respondents at Dabasah 5 Bondowoso Elementary School to determine the effect of hydration education with animated videos on changes in water drinking behavior.

Table 1 Distribution of Respondents at Dabasah 5 Bondowoso Public Elementary School (n: 60)

Class	Frequency	Presentation
V	30	50%
VI	30	50%
Total	60	100%
Age	Frequency	Presentation
11 Years	25	41,7%
12 Years	35	58,3%
Total	60	100%

(Primary data source, 2026)

Table 1. shows that of the 43 respondents almost half (37.2%) of the respondents were 12 years of age. Based on table 1, the age distribution shows that in class V there are 25 students aged 11 years and 5 students aged 12 years, while all students in class VI (30 people) are aged 12 years. It is known that most of the respondents are aged 12 years as many as 35 people (58.3%), while respondents aged 11 years as many as 25 people (41.7%).

Table 2 Distribution Frequency of Water Drinking Habits in Dabasah 5 Elementary School Students Before Education (Pretest) (n:60)

Category	Frequency	Presentation
Well	7	11,7%
Enough	52	86,7%
Less	1	1,7%
Total	60	100%

(Primary data source, 2026)

Based on these results before the intervention was given, the majority of respondents had water drinking habits in the sufficient category, namely 52 students (86.7%), the good category was 7 students (11.7%), and the insufficient category was 1 student (1.7%).

Table 3 Distribution of Frequency Water Drinking Habits in Dabasah 5 Elementary School Students After Education (Posttest) (n:60)

Category	Frequency	Presentation
Well	49	81,7%
Enough	11	18,3%
Total	60	100%

(Primary data source, 2026)

Based on these results, after being given hydration education with animated videos, there was an increase in water drinking behavior, where the majority of respondents were in the good category, as many as 49 students (81.7%) and the sufficient category, as many as 11 students (18.3%).

Table 4 Cross-tabulation of Pretest and Posttest Results of Water Drinking Habits

Category	Pretest n (%)	Posttest n (%)	P. Value
Well	7 (11,7%)	49 (81,7%)	,000
Enough	52 (86,7%)	11 (18,3%)	
Less	1 (1,7%)	0 (0%)	
Total	60 (100%)	60 (100%)	-

(Primary data source, 2026)

Based on the research results, there was an increase in students' water drinking habits after receiving hydration education using animated videos. During the pretest, the majority of respondents (52 students) were in the "Enough" category, while after the intervention, the majority of respondents (86.7%) were in the "Well" category, with 49 students (81.7%).

The Wilcoxon Signed Rank Test showed a P-Value of 0.000 (<0.05), thus rejecting H_0 and accepting H_{a1} . Therefore, it can be concluded that hydration education using animated videos significantly influenced changes in water drinking habits among students at Dabasah 5 Elementary School, Bondowoso.

Discussion

1. Water Drinking Behavior of Students of Dabasah 5 Elementary School, Bondowoso Before Intervention (Pretest)

Based on the results of a study conducted on 60 students at Dabasah 5 Elementary School in Bondowoso, pre-test results of their water drinking habits before receiving hydration education using animated videos showed that the majority of respondents, 52 students (86.7%), were in the adequate category. This condition is reflected in the students'

tendency to consume water only when thirsty and their preference for sugary drinks over water in their daily activities. This indicates that students do not yet have an adequate understanding of the importance of maintaining body fluid balance from an early age.

The low pre-test scores in this study were influenced by several interrelated factors. The most dominant factor was students' lack of knowledge about the importance of hydration, including daily fluid requirements and the potential impacts of dehydration. Furthermore, environmental factors also play a role, as the habit of consuming sugary drinks in the surrounding environment, both at home and at school, can influence students' preferences regarding the types of drinks they consume. A lack of prior exposure to health education also contributes to students' lack of understanding of the importance of drinking water regularly. At elementary school age, students tend not to have a high level of self-awareness regarding health, so their behavior is largely influenced by habits and the environment (Rosinger et al., 2024; Setyawan & Sofyan, 2024).

In theory, the results of this study align with Notoatmodjo's (2020) opinion, which states that knowledge is a primary factor in developing healthy behaviors. Individuals with low levels of knowledge tend to exhibit inappropriate behaviors, including maintaining hydration. Previous research also shows that elementary school-aged children generally have poor water drinking habits due to a lack of health education and high consumption of sweetened beverages (Saftarina & Fauziah, 2023).

These results are also supported by research by Rosinger et al. (2024), which states that most schoolchildren experience inadequate fluid intake during school hours, increasing the risk of mild dehydration. This study explains that low water consumption in children is influenced by the lack of habit of carrying a water bottle, limited access to healthy drinking water, and a lack of hydration education in the school environment. Furthermore, research by Saftarina & Fauziah (2023) found that although some students felt they were drinking enough, objective examinations showed that many still experienced mild dehydrations due to irregular drinking patterns. These findings suggest that children's perceptions of adequate fluid intake often do not align with the body's physiological needs.

Another study conducted by Drozdowska et al. (2020) also showed that most elementary school children had low water intake habits from morning to afternoon. This habit led to decreased concentration, short-term memory, and learning readiness in school. This condition shows that poor water drinking behavior not only impacts physical health but can also affect children's cognitive function during the learning process. Inadequate hydration may reduce attention, memory, and information-processing abilities, making it

more difficult for children to concentrate and actively participate in classroom activities. Over time, these cognitive impairments may negatively influence academic performance, learning outcomes, and overall school achievement. The results of this study reinforce the fact that poor water drinking habits among students at Dabasah 5 Elementary School, Bondowoso, before intervention remain a problem that requires attention.

Furthermore, research by Abugabal *et al.* (2024) explained that children with poor hydration status tend to experience decreased attention and learning performance compared to children with adequate hydration. This suggests that irregular water drinking habits can negatively impact children's health and learning abilities at school. These findings align with the pretest results of this study, which found that most students were still in the adequate category and had not demonstrated optimal hydration behaviors (Abugabal *et al.* 2024)..

2. Water Drinking Habits Among Students at Dabasah 5 Elementary School, Bondowoso, After Intervention (Posttest)

After receiving an intervention in the form of hydration education using animated videos, posttest results showed an improvement in students' water drinking habits. The majority of respondents (49 students) were in the good category. There were no further respondents in the poor category. These results indicate that hydration education using animated videos was able to increase students' understanding and awareness of the importance of drinking water regularly. This improvement indicates that the intervention resulted in positive changes in students' water drinking behavior. These changes were evident in students' increased awareness of drinking water more regularly and a reduced dependence on sugary drinks.

This increase in posttest scores was influenced by several important factors. The primary factor was increased student knowledge after receiving education about the importance of hydration, the function of water in the body, and the negative impacts of dehydration. Furthermore, the use of animated videos in the educational process played a significant role in improving student understanding. This medium presents information in an engaging way through a combination of visuals and audio, making it easier for elementary school students to understand. The three-session education session also reinforced the material presented, enabling students not only to receive information but also to remember and apply it in their daily lives (Saftarina & Fauziah, 2023).

The results of this study align with the multimedia learning theory proposed by Richard E. Mayer and Logan Fiorella (2025), which states that delivering information

through a combination of visuals and audio can improve understanding and memory. Previous research also shows that animation-based education is effective in improving health behaviors in elementary school children because it captures attention and increases student engagement in the learning process.

Previous research conducted by Mukhtiarny *et al.* (2023) showed that the use of animated video media in health education significantly improved student understanding and retention compared to conventional methods. The study found that students more easily understood health material when presented through engaging and interactive audiovisual media. These findings align with the results of the current study, which found that students demonstrated improved water drinking behavior after receiving education using animated videos.

Furthermore, research (Hang & Juanda 2023) also explains that animation-based health education is more effective than traditional lecture methods in increasing the knowledge and engagement of elementary school students. Children tend to be more focused and enthusiastic in learning when the material is presented through engaging, moving media. Research (Sari *et al.* 2025) also states that animation media not only increases knowledge but also shapes attitudes and intentions towards healthy behaviors in elementary school children.

These research findings are further supported by research Tuo *et al.* (2023), which states that animated video-based health education is effective in improving children's healthy behaviors because audiovisual media can provide simultaneous visual and auditory stimulation. The study explained that children who received education through animated videos understood the material more easily and were more motivated to implement healthy behaviors in their daily lives. These findings support research that students began to show behavioral changes by drinking more water and reducing their consumption of sugary drinks after the intervention.

Research (Rosinger *et al.* 2024) also shows that hydration education programs in schools can increase water consumption habits and improve the hydration status of schoolchildren. In addition to improving water-drinking behavior, hydration education also improves students' concentration and learning readiness. Research conducted by McDermott *et al.* (2024) through the CogniDROP Study found that regular water-drinking education interventions in schools positively impacted children's attention and working memory.

3. Discussion: The Effect of Hydration Education with Animated Videos on Changes in Water Drinking Behavior in Students at Dabasah 5 Elementary School, Bondowoso

The Wilcoxon test results in this study showed a p-value of 0.000 ($p < 0.05$), indicating a significant effect between hydration education and changes in students' water drinking behavior. Furthermore, the analysis showed that 59 respondents experienced an increase in scores after the intervention, indicating that the intervention was highly effective in improving water drinking behavior.

The success of this intervention was influenced by several factors, including the educational method used, the duration of the intervention (three sessions), and the relatively homogeneous characteristics of the respondents, who were elementary school students. The material provided was also applicable and tailored to students' needs, making it easier to understand and apply in everyday life. This indicates that the education provided not only increased knowledge but also significantly changed students' attitudes and behaviors (Saftarina & Fauziah, 2023).

The results of this study align with the theory of behavioral change, which states that increased knowledge will be followed by changes in attitudes and ultimately influence individual behavior. Previous research also supports this finding, where visual media-based health education has been shown to be effective in improving health behaviors in children (Saftarina & Fauziah, 2023; Qomariyah *et al.*, 2025).

These results also align with the Cognitive Theory of Multimedia Learning (Mayer and Fiorella, 2025), which explains that learning using a combination of visuals and audio can improve students' understanding, attention, and memory retention. In this study, the use of animated videos made students more engaged in the educational process compared to traditional lectures. This made the material more easily absorbed and understood by elementary school students (Khoirudin & Prihanto, 2026).

Previous research by Mukhtiarny *et al.* (2023) showed that animated videos effectively improved children's understanding and retention in health education. This study explained that audiovisual media can create a more engaging learning environment, making students more active and easier to understand the material presented. These results align with this study, where most students experienced improved water drinking behavior after being taught hydration using animated videos (Tatum *et al.*, 2024).

Furthermore, research (Hang & Juanda 2023) found that animation-based health education was more effective in improving health knowledge than conventional methods. The use of moving images and sound helps children focus better during the learning

process. Research (Sari et al. 2025) supports this finding by stating that animation media not only increases knowledge but also influences attitudes and healthy behavior intentions in elementary school children.

These findings are further supported by research (Tuo et al. 2023), which explains that health education using animated videos is effective in encouraging sustainable changes in children's health behaviors. Children who receive audiovisual education tend to remember information more easily and are more motivated to apply it in their daily lives. In this study, students began to show behavioral changes such as increased water consumption, bringing water bottles to school, and reducing consumption of sugary drinks after receiving a hydration education intervention.

Research (Rosinger et al. 2024) also shows that hydration education programs in schools can increase water consumption and improve students' hydration habits. The study found that regular education can increase students' awareness of the importance of maintaining fluid balance during school activities. Furthermore, research (McDermott et al., 2024) conducted through the CogniDROP Study demonstrated that hydration interventions for schoolchildren positively impacted students' attention and working memory.

In this study, one respondent experienced a decrease in scores after the intervention. This indicates a slight discrepancy with the ideal theory that educational interventions would have a positive impact on all respondents. This difference could be influenced by various factors, such as a lack of family support, pre-established individual habits, low internal motivation, and varying levels of attention during the educational process. Environmental and social factors do influence the development of water drinking behavior in elementary school children. Support from parents, teachers, and peers is also important. Yes, water plays a significant role in strengthening children's daily healthy habits.

Furthermore, research (Gerstenfeld et al. 2025) indicates that not all children are able to maintain changes in healthy behaviors quickly because behavior is influenced by complex internal and external factors. Children from less supportive environments or those with a high consumption of sugary drinks tend to take longer to achieve optimal behavior change. Therefore, continued education and support from family and school are essential for maintaining long-term changes in water drinking behavior (Gerstenfeld et al. 2025).

However, in this study, one respondent experienced a decrease in scores after the intervention. This indicates a slight difference from the ideal theory that educational

interventions will have a positive impact on all respondents. This difference could be caused by various factors, such as the influence of the family environment, pre-established individual habits, and the student's level of attention during the educational process (Gerstenfeld et al., 2025).

Conclusion

Based on the results of the study on the effect of hydration education using animated videos on water drinking habits among students at Dabasah 5 Elementary School, Bondowoso, the following conclusions was water drinking habits before the hydration education (pretest) were categorized as adequate for 52 students (86.7%), good for 7 students (11.7%), and poor for 1 student (1.7%). Water drinking habits after the hydration education (post-test) were categorized as good for 49 students (81.7%), and adequate for 11 students (18.3%). There was an effect of hydration education using animated videos on changes in water drinking habits, as evidenced by the Wilcoxon test with a p-value of 0.000 ($p < 0.05$). Therefore, it can be concluded that the intervention was effective in improving students' water drinking habits.

Author Contributions

Author 1 conceived and designed the study, conducted the research, collected and analyzed the data, interpreted the findings, and prepared the original draft of the manuscript. Author 2 supervised the research, contributed to the study design and data interpretation, critically reviewed and revised the manuscript for important intellectual content, and approved the final version of the manuscript. Both authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this research. This study was conducted independently, and the authors have no financial, professional, or personal relationships that could have influenced the research process, the interpretation of the findings, or the reporting of the results.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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