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RESEARCH ARTICLE

Enhancing Dental Health Knowledge Through The Combination of Storytelling and Interactive Activities at TK Sepuluh November

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ABSTRACT

Background: *Dental health in pre-school children is an important aspect that should be introduced early. However, cognitive limitations and short attention spans at this age require educational methods appropriate to their developmental stage. Pojok Sikat Gigi is an activity that consists of various health promotion and preventive strategies carried out at TK Sepuluh November Surabaya, targeting teachers, parents, and students. One strategy is dental health education through storytelling, using hand puppets and interactive activities.* ***Objective:*** *This study aimed to determine the effectiveness of dental health education with storytelling and interactive activities on improving pre-school students' knowledge of dental health.* ***Method:*** *34 students aged between 5-7 were the sample in this research. This was a pre-experimental research with a pre- and post-test design. The pre-test score was measured through a Q&A session before education. The post-test score was measured by asking students to write down their answers on a piece of paper, guided by the researcher who read the same questions. The pre- and post-test knowledge scores were compared using the Wilcoxon statistical test to assess whether there was a significant difference after the educational intervention.* ***Results:*** *The mean pre-test score was 2.24, and the post-test score was 5 (maximum score was 5). The Wilcoxon test value was sig=0.00<0.05, meaning that there was a significant difference between the scores before and after education.* ***Conclusion:*** *The storytelling method and interactive activities are effective in improving pre-school students' knowledge of dental health.*

Keywords: *Dental health education, health promotion, pre-school children, preventive dental health, storytelling*

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Denta: Jurnal Kedokteran Gigi, Februari 2026; Vol.20 No.1; Hal 16-22
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INTRODUCTION

Oral health in pre-school children is an important part of their growth and development that needs to be introduced early on. Recent national survey data also indicate that dental caries prevalence remains high, reaching 82.8% in the 2023 Indonesian Health Survey, confirming that oral health problems in children are still a major public health issue.[1] At this age, children are in the habit-forming phase, which means education about dental hygiene greatly influences their future behavior. However, pre-schoolers have limitations in terms of cognitive aspects, the ability to understand abstract information, and a relatively short attention span. This condition requires an educational approach that is not only informative but also fits the child's stage of development, engaging, and easy to understand.[2,3]

The researchers and their team designed a program called the Toothbrushing Corner, a series of dental health promotion activities targeting teachers, parents, and especially students, to create synergy between teachers and parents and improve the dental and oral health status of pre-school children. This program includes various promotive and preventive strategies consisting of:

Table 1. *Pojok Sikat Gigi* Programs

Target	Activities
Teachers	Workshop on creating dental health co-curricular and basic skills for maintaining pre-school children's dental health
Students	• Oral health education using storytelling with hand puppets and interactive activities • Practicing brushing teeth together • Oral health screening • Topical fluoride application for cavity prevention
Parents	Children's dental health talk show with an expert

Different evaluation methods were used to determine the effectiveness of each activities. This study was conducted especially to evaluate one of the activities: dental health education using hand puppets and interactive activities. This study aimed to determine the effectiveness of storytelling and interactive activities in improving pre-schoolers' knowledge of dental health at TK Sepuluh November Surabaya.

The target of this study was preschool-aged children. Preschool-aged children are in the preoperational stage according to Piaget's theory of cognitive development, where learning processes are more effective when conducted through concrete, visual, imaginative, and enjoyable experiences.[2] At this stage, children are not yet able to understand abstract concepts in depth; therefore, delivering dental health education through conventional methods such as lectures tends to be ineffective. Therefore, educational methods are needed that can attract children's attention, engage their emotions, and stimulate active participation so that health messages can be well understood and remembered.[3]

Storytelling using hand puppets is an educational approach that is considered appropriate for pre-schoolers. Hand puppets serve as visual and symbolic media that can facilitate communication between educators and children. Through simple and interesting stories, messages about the importance of brushing teeth, avoiding excessive consumption of sugary foods, and maintaining dental and oral health can be conveyed indirectly, making it easier for children to accept and imitate them. In addition, the emotional interaction built through puppet characters can increase children's engagement and memory of educational material.[4,5]

Interactive educational media, such as educational games, audio-visual media, and participatory question-and-answer activities, also have great potential for improving the effectiveness of dental health education. Interactive media allow children to learn through direct experience (learning by doing), engage

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more than one sense, and encourage children to actively participate in the learning process. This interactivity can increase children's motivation to learn and help them internalize healthy behaviors from an early age.[6,7]

Through stories and interactive activities, children can associate new information with familiar characters, situations, and plots, thereby reinforcing messages about dental health. The use of media such as hand puppets, picture books, or interactive games also helps create a fun learning environment and reduces boredom, allowing children to focus and engage more actively.[5,7]

The effectiveness of storytelling and interactive activities approaches in the context of dental health programs needs to be scientifically tested through structured research. Data-based evaluation is needed to ensure that this method truly has an impact on improving children's knowledge while also serving as the basis for developing more optimal educational strategies in early childhood education institutions.

MATERIALS AND METHODS

This study was conducted at TK Sepuluh November, Surabaya. 34 out of 37 students Kindergarten B students were randomly selected as respondents through a sample size calculated using the Slovin formula. All respondents obtained parental consent through the signing of an informed consent. The type of research used was pre-experimental with a pre-test and post-test design without a control group. Pre-test scores were measured through a question-and-answer session before the education, where the researcher asked questions to the students and recorded their answers directly. Post-test scores were obtained by asking students to write their answers on individual sheets of paper, guided by the researcher, who read the same questions aloud. Dental health education was divided into three sessions :

1. Story telling with a puppet doll for an introduction to toothache and its treatment (10 minutes)
2. Interactive session with a big activity book and tooth shaped doll equipped with removable velcro fasteners for teaching children about foods that are good and bad for their teeth (15 minutes)
3. Interactive session with 2D toothbrush simulation (15 minutes)

Figure 1. Dental Health Education with Story Telling and Interractive Activities

Table 2. Questionaire

No	Questions
1	How many baby teeth are there?
2	How many adult teeth are there?
3	How many times a day should you brush your teeth?
4	What foods are good for dental health?
5	What foods are bad for dental health?

Each correct answer received a score of 1, the minimum score was 0, and the maximum score was 5. The pre- and post-test knowledge scores were compared using the Wilcoxon statistical test to assess whether there was a significant difference after the educational intervention.

Denta: Jurnal Kedokteran Gigi, Februari 2026; Vol.20 No.1; Hal 16-22
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RESULT

The frequency of each student's right answers on the pre-test and post-test can be seen in the table below (Picture 2).

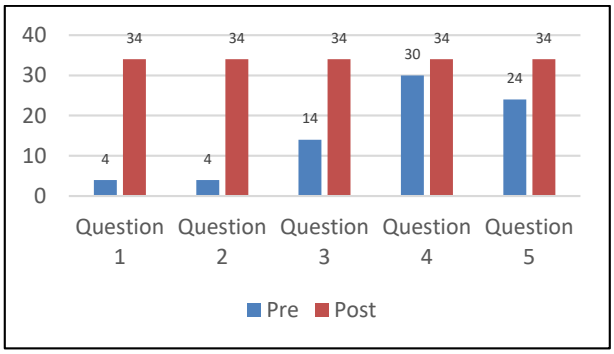

Figure 2. The frequency of each student's right answer

The results in Figure 2 show that most students had the correct answers in question 4, followed by questions 5, 3, 2, and 1.

The pre- and post-test scores were analyzed statistically, and the results are as follows (Tables 3, 4, 5):

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Before	34	1.00	3.00	2.2353	.55371
After	34	5.00	5.00	5.0000	.00000
Valid N (listwise)	34				

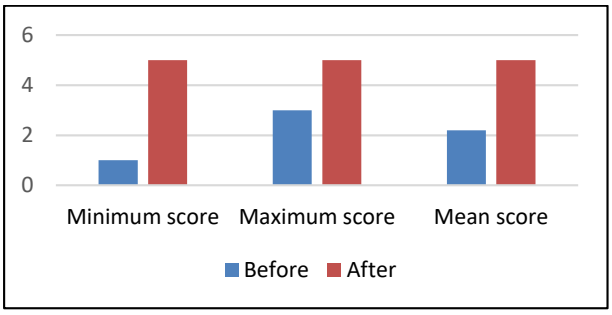

Figure 3. Comparison of minimum, maximum, and mean score of the level of knowledge between before and after education

The statistical test results showed that there was an increase in the average knowledge level score from before education to after education. Before education, no students answered all questions correctly, as evidenced by a minimum score of 1 and a maximum score of 3, whereas after education, all students were able to answer the questions correctly with the same minimum and maximum scores of 5.

Table 3. Normality Test

	Statistic	df	Statistic	df	Sig.
Before	.370	34	.722	34	.000
After	.	34	.	34	.

The normality test showed a sig value of 0.00<0.05, meaning that the data were not normally distributed. Therefore, the parametric statistical assumption could not be fulfilled, and the statistical test was continued with the Wilcoxon signed-rank test.

Table 4. Wilcoxon Signed Rank Test

Test Statistics	Before-After Storytelling & Interractive Activities Education
Z	-5.276[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

The Wilcoxon signed-rank test results showed a sig value of 0.00<0.05, indicating a significant difference in pre-schoolers' dental health knowledge scores before and after education using storytelling and interactive activities.

DISCUSSION

The variation in students' correct answer scores across dental health questions may be influenced by differences in the level of familiarity, concreteness of concepts, and prior exposure to oral health information. In this study, most students answered Question 4 correctly, followed by Questions 5, 3, 2, and 1. Alrashdi et all (2022), in their study about oral health promotion in pre-schoolers said that children

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tend to demonstrate better understanding of dental health concepts that are more concrete, familiar, and closely related to daily habits.[8] Question 4, which showed the highest correct responses, may represent knowledge that children encounter regularly through parental guidance, school activities, or health education programs. Repetition of routine behaviors strengthens memory retention and facilitates recall.[9]

The results of this study show a significant increase in dental health knowledge among pre-school students after being educated through storytelling using hand puppets and interactive activities. The average knowledge score increased from 2.24 on the pre-test to 5.00 on the post-test, with the Wilcoxon test showing a significance value of p=0.000 (p<0.05). This indicates that the educational intervention provided was effective in improving pre-schoolers' understanding of dental and oral health.

This significant increase in knowledge can be explained through the cognitive development approach of pre-school children. According to Piaget's theory, preschool-aged children are in the preoperational stage, where the learning process is more optimal when done through concrete, visual, and imaginative experiences. Damjanovic et al (2025) stated in their study that pre-school learning improves when teachers use tangible materials and hands-on tools, consistent with Piaget's view that children learn through active engagement with real or similar objects.[10]

The storytelling method using hand puppets is able to present health messages in a symbolic and narrative form that is easily understood by children, so that the information conveyed is not abstract.[11] Stories allow children to associate dental health messages with interesting characters and storylines, thereby improving their memory and understanding.[4,8,10]

In addition, the use of interactive activities in dental health education plays an important role in the success of this intervention. Interactive activities involve the active participation of children through question-and-answer sessions, games, and demonstrations, so that the learning process is not one-sided.[12,13] This approach is in line with the concept of learning by doing, where children learn through direct experience. Recent research shows that interactive media can improve focus, learning motivation, and knowledge retention in early childhood compared to conventional methods such as lectures.[7,8,14]

The results of this study are in line with various previous studies that report that storytelling methods and educational play media are effective in improving dental health knowledge and attitudes in early childhood.[4,8,11] Storytelling with hand puppets in particular are considered capable of building emotional engagement between children and educators, so that health messages are conveyed persuasively without giving the impression of lecturing. This emotional interaction contributes to increased interest and attention in children during the educational process.[11,13,15]

The finding that all respondents obtained maximum scores on the post-test shows that this method is very suitable for pre-school students. However, these results require critical examination. Although this study provides empirical evidence that dental health education through storytelling and interactive activities can be an effective alternative strategy for promoting dental health in early childhood education settings, several limitations should be critically considered when interpreting the findings. The pre-experimental research design without a control group limits the ability of the study to compare the effectiveness of this method with other educational methods. Without comparison to a group that did not receive storytelling and interactive activities, it is difficult to exclude alternative explanations. In addition, knowledge was measured immediately after the intervention, so it does not yet describe the sustainability of understanding and long-term behavioral changes in children.[16-18] In early

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childhood education, increases in knowledge do not always translate directly into sustained oral health practices, as behavior formation requires repetition, reinforcement, and environmental support over time.[19,20]

However, this study provides empirical evidence that dental health education through storytelling and interactive activities can be an effective alternative strategy for promoting dental health in early childhood education settings. This approach also supports the concept of the Toothbrushing Corner program, which emphasizes synergy between schools, children, and a pleasant learning environment. In the future, this method has the potential to be further developed with long-term evaluation and combined with parental involvement to strengthen the formation of healthy behaviors from an early age.

CONCLUSION

The storytelling method and interactive activities were effective in improving pre-school students' knowledge of dental health in KB-TK Sepuluh November Surabaya.

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Denta: Jurnal Kedokteran Gigi, Februari 2026; Vol.20 No.1; Hal 16-22
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Denta: Jurnal Kedokteran Gigi, Februari 2026; Vol.20 No.1; Hal 16-22
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