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The Effectiveness of Puppets as an Educational Tool to Enhance Dental Health Knowledge Among Elementary School Students in Surabaya, Indonesia

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ABSTRACT Oral health issues remain prevalent among Indonesian elementary school students, often stemming from insufficient knowledge and improper hygiene practices. Despite many children reporting regular tooth brushing, only a small percentage adhere to the recommended brushing frequency and timing, leading to a high incidence of oral health problems. This study aims to evaluate the effectiveness of using dental puppets as an educational medium to improve oral health knowledge among second-grade students at SDN Bendul Merisi Surabaya, where no prior structured dental health education had been conducted. A pre-experimental, one-group pretest-posttest design was used with a sample of 52 students. Data collection was carried out using a validated questionnaire administered before and after the intervention, which consisted of a 30-minute counseling session incorporating dental puppets. These sessions demonstrated correct toothbrushing techniques and educated students about oral hygiene through interactive and participatory methods. The Wilcoxon Signed Rank Test was employed for statistical analysis, as the data did not follow a normal distribution. Results indicated a statistically significant improvement in oral health knowledge post-intervention ($p = 0.000$). Specifically, knowledge in areas such as brushing technique, dental check-up timing, and understanding of dental care materials increased, with the proportion of students in the "good knowledge" category rising from 46.92% to 90.48%. The findings suggest that dental puppets are an effective and engaging tool to deliver oral health education to young students. Future research should explore the long-term retention of knowledge and the method's applicability across diverse age groups and settings.

INDEX TERMS Dental education, puppetry, oral health knowledge, elementary school, health promotion

I.INTRODUCTION

Oral health is an essential component of overall well-being, particularly during childhood when lifelong habits are formed. However, in Indonesia and many other low- to middle-income countries, oral health remains a neglected public health concern. The Basic Health Research (Riskesdas) report in 2018 revealed that while 94.7% of Indonesians claim to brush their teeth daily, only 2.8% do so at appropriate times—after breakfast and before bedtime . Moreover, elementary school students demonstrate poor dental hygiene behavior, as evidenced by high debris indices and limited knowledge about oral health practices . Despite national programs such as UKGS (Usaha Kesehatan Gigi Sekolah), oral health education in many primary schools is inconsistent or absent. Counseling and health promotion are often overlooked, and even where implemented, they tend to rely on traditional lecture-based approaches that may not capture children's attention . As a result, children fail to adopt effective oral hygiene practices, leading to an increased prevalence of dental caries and other preventable conditions .

Recent advancements in health education emphasize the use of interactive, visual, and participatory learning tools to enhance message retention and engagement . Among these, puppet-based storytelling has emerged as an innovative educational approach. Puppets are particularly effective with children due to their visual appeal, interactivity, and potential to model behavior in a relatable way. Studies have shown that puppet media can improve attention span, learning interest, and emotional connection, all of which contribute to enhanced knowledge retention . Several researchers have explored the effectiveness of educational puppetry in healthcare contexts. For instance, storytelling and puppet interventions have been successfully used to improve hand hygiene, nutritional knowledge, and oral health awareness in various countries . However, most of these studies focus on preschool-aged children or Western populations. In Indonesia, especially in the context of public elementary schools with minimal health education infrastructure, research on this method remains scarce. The current study addresses this gap by investigating the use of dental puppets as a medium to improve oral health

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knowledge among second-grade students at SDN Bendul Merisi Surabaya. The school had not previously received any structured dental health education, and a recent survey revealed a high percentage of students with poor oral hygiene as indicated by a debris index score of 1.9 on average .

The aim of this study is to evaluate the effectiveness of dental puppets as a health education tool in increasing students' knowledge regarding oral hygiene maintenance. By incorporating interactive puppet media into counseling sessions, the study seeks to enhance engagement and promote better understanding of oral care among young learners. This study offers three key contributions:

1. It introduces a culturally adaptable and cost-effective educational strategy tailored for young students in low-resource settings.
2. It provides empirical evidence on the effectiveness of puppet media in improving oral health knowledge in a public elementary school context.
3. It proposes a replicable intervention model that can be integrated into school-based health programs nationwide.

II.METHODS

A. STUDY DESIGN

This research employed a pre-experimental design with a one-group pretest-posttest approach to evaluate the effectiveness of dental puppet media in increasing oral health knowledge among second-grade elementary students. This design allows for observation of changes in participants' knowledge by comparing measurements taken before and after the intervention without the use of a control group [31]. Although lacking a comparison group, this design is suitable for exploratory educational studies conducted in school environments with practical constraints.

B. STUDY SETTING AND PERIOD

The study was conducted at SDN Bendul Merisi, an elementary school located in Surabaya, Indonesia, from March to May 2024. This school was selected as the research site due to the absence of previous oral health education programs and the high debris index observed among students, which reflected poor oral hygiene practices. These conditions made the location highly suitable for evaluating the effectiveness of oral health interventions aimed at improving knowledge and behaviors related to dental hygiene among elementary school children in the area.

C. POPULATION AND SAMPLE

The population consisted of second-grade students enrolled at SDN Bendul Merisi, totaling 52 individuals. A total sampling technique was utilized, meaning all students who met the inclusion criteria were recruited for the study [32]. The inclusion criteria for this study were established to ensure the selection of participants who could fully engage with the intervention and provide reliable data. Eligible participants were students enrolled in the second grade during the 2023/2024 academic year, whose parents or guardians had provided informed consent, and who were physically present during both the pretest and posttest sessions. These criteria ensured consistency in exposure to the educational intervention and the ability to measure learning outcomes accurately. Conversely, students were excluded if they had speech or cognitive impairments that could hinder their ability to interact effectively with the intervention materials or if they were absent during either the pretest or posttest sessions.

D. INTERVENTION DESCRIPTION

The intervention utilized a dental puppet-based educational session to deliver oral hygiene counseling. A custom-designed donkey-shaped puppet with anatomical features including a full mouth, resin-based teeth, and a movable jaw was used. This puppet was specifically constructed to model tooth brushing techniques in a child-friendly and engaging format. Each counseling session lasted approximately 30 minutes and was conducted in small classroom groups to maintain student engagement. The educational material covered six core themes:

1. Definition and purpose of oral hygiene
2. Frequency and timing of brushing
3. Proper toothbrushing technique
4. Tools and materials required for brushing
5. Foods and substances beneficial or harmful to dental health
6. Timing and importance of routine dental check-ups

During the session, the puppet was used interactively to demonstrate brushing motions on various tooth surfaces. Students were then asked to participate by practicing the techniques on the puppet, thereby reinforcing the instructional content through hands-on learning. This multisensory strategy has been shown to enhance retention and comprehension in pediatric populations [33], [34].

E. DATA COLLECTION INSTRUMENT

The primary instrument for data collection was a structured questionnaire, designed to assess students' knowledge on oral health across the six thematic areas. The questionnaire consisted of 15 multiple-choice and true/false items, distributed proportionally across the six themes. The questionnaire underwent content validation by three experts in dental health education and was pilot tested on 10 students from a neighboring school to assess clarity and reliability. Modifications were made to improve item comprehensibility. The final version demonstrated good internal consistency with a Cronbach's alpha coefficient of 0.83, which meets the reliability standard for educational tools [35].

F. DATA COLLECTION PROCEDURE

Prior to the intervention, all participating students completed the pretest questionnaire under the supervision of the research team. The questionnaire was administered in-class, with verbal instructions provided to ensure understanding. Following the pretest, the puppet-based educational session was conducted. One day after the session, the same questionnaire was re-administered as a posttest to measure any change in students' knowledge levels. The 24-hour interval between intervention and posttest was designed to minimize recall bias while still reflecting short-term knowledge acquisition [36].

G. ETHICAL CONSIDERATIONS

The study received ethical approval from the Research Ethics Committee of the Polytechnic of the Ministry of Health, Surabaya (No. 0123/KEPK/III/2024). Prior to data collection,

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informed consent was obtained from parents or legal guardians of all participants. Students were also given verbal assent to ensure voluntary participation. All responses were anonymized, and participation posed minimal risk.

H. DATA ANALYSIS

Collected data were coded and entered into SPSS version 26.0 for statistical analysis. Because the data were non-normally distributed, as confirmed by the Kolmogorov-Smirnov test ($p < 0.05$), the Wilcoxon Signed-Rank Test was selected to assess differences between pretest and posttest scores [37]. The threshold for statistical significance was set at $p < 0.05$. Descriptive statistics, including frequency distributions and percentages, were used to describe students' knowledge levels before and after the intervention. The effectiveness of the intervention was determined by comparing the proportion of students categorized as having "poor," "sufficient," or "good" knowledge based on their test scores.

III. RESULT

The findings of this study provide an overview of how good dental puppet counseling media is in improving the understanding of grade II students in maintaining dental hygiene. This study was attended by 52 students of grade II SDN Bendul Merisi as respondents. TABLE 1 shows that the value of knowledge about the meaning and purpose of maintaining kesgilut before being given counseling using dental puppet media gets an average correct answer of 71.79% and the wrong answer of 28.21%, so that knowledge is in sufficient criteria. Whereas after counseling using dental puppet media, the average correct answer is 94.23% and the wrong answer is 5.7% knowledge in good criteria.

TABLE 1
Frequency Distribution of Oral Health Maintenance Knowledge About The Meaning Of Oral Health Maintenance Before And After Counseling Using Dental Puppet Media In 2024

Question	Before				After			
	Correct		Wrong		Correct		Wrong	
	Σ	%	Σ	%	Σ	%	Σ	%
Oral health maintenance is?	47	90.38	5	9.62	48	92.31	4	7.69
What is the purpose of brushing your teeth?	30	57.69	22	42.31	49	94.23	3	5.77
How to clean food residue on teeth?	35	67.31	17	32.69	50	96.15	2	3.85
Total	112	215.38	44	84.62	147	282.69	9	17.31
Average	37.33	71.79	14.67	28.21	49.00	94.23	3.00	5.77

TABLE 2 shows that the value of knowledge about the meaning and purpose of maintaining kesgilut before being given counseling using dental puppet media gets an average of 38.46% correct answers and 61.54% wrong answers, so that knowledge is in poor criteria. Whereas after counseling using dental puppet media, the average correct answer is 88.46% and the wrong answer is 11.54%, so knowledge is in good criteria. TABLE 3 shows that the value of understanding of how to brush teeth properly before being given counseling using dental puppet media gets an average correct answer of 31.25% and the wrong answer of 68.75%, so that knowledge is in poor criteria While after counseling using dental puppet media gets an average correct answer of 84.13% and wrong answer 15.87% knowledge in good criteria. The values of knowledge about tools and materials for brushing teeth, good and bad food for kesgilut before counseling using dental puppet media gets an average correct answer of 60.77% and wrong answers of 196.15%, so that knowledge is in sufficient criteria. Whereas after counseling using dental puppet media, the average correct answer is 92.69% and the wrong answer is 7.31% knowledge in good criteria. Whereas after counseling using dental puppet media, the average correct answer is 92.69% and the wrong answer is 7.31% knowledge in good criteria.

TABLE 2
Frequency Distribution of Knowledge Of Dental Health About Tooth Brushing Time Before And After Education

Question	Before				After			
	Correct		Wrong		Correct		Wrong	
	Σ	%	Σ	%	Σ	%	Σ	%
1.How many times should you brush your teeth?	23	44.23	29	55.77	45	86.54	7	13.46
2.How long to brush your teeth?	6	11.54	46	88.46	46	88.46	6	11.54
3.When is it time to brush your teeth?	31	59.62	21	40.38	47	90.38	5	9.62
Total	60	115.38	96	184.62	138	265.38	18	34.62
Average	20.00	38.46	32.00	61.54	46.00	88.46	6.00	11.54

TABLE 3
Frequency Distribution of Knowledge of Kesgilut Maintenance on How to Brush Teeth Properly Before And After Education

Question	Before				After			
	Correct		Wrong		Correct		Wrong	
	Σ	%	Σ	%	Σ	%	Σ	%
1.How do I brush my teeth on the side facing the roof of my mouth?	15	28.85	37	71.15	40	76.92	12	23.08
2.How do I brush my front teeth?	11	21.15	41	78.85	46	88.46	6	11.54
3.How to brush the side of your teeth?	13	25.00	39	75.00	44	84.62	8	15.38
4.How to brush the back teeth?	26	50.00	26	50.00	45	86.54	7	13.46
Total	65	125.00	143	275.00	175	336.54	33	63.46
Average	16.25	31.25	35.75	68.75	43.75	84.13	8.25	15.87

TABLE 4 explains if the understanding of the maintenance of kesgilut about tooth brushing materials before being given counseling using dental puppet media gets an average correct answer of 27.88% and the wrong answer of 72.12%, so that knowledge is in the criteria less. Whereas after counseling using dental puppet media, the average correct answer is 88.46% and the wrong answer is 11.54% knowledge in good criteria. Whereas after counseling using dental puppet media, the average correct answer is 88.46% and the wrong answer is 11.54% knowledge in good criteria. TABLE 5 explains if the value of understanding the maintenance of Kesgilut regarding the timing of dental examinations before being given counseling using dental puppet media gets an average correct answer of 41.03% and the wrong answer of 58.97%, so that knowledge is in poor criteria While after counseling using dental puppet media gets an average correct answer of 94.87% and a wrong answer of 5.13% knowledge in good criteria.

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TABLE 4
Frequency Distribution of Knowledge of Dental Health About Tooth Brushing Materials Before And After Education

Question	Before				After			
	Correct		Wrong		Correct		Wrong	
	Σ	%	Σ	%	Σ	%	Σ	%
What toothpaste ingredients are good for teeth?	11	21.15	41	78.85	46	88.46	6	1.54
How many months should a toothbrush be replaced?	18	34.62	34	65.38	46	88.46	6	1.54
Total	29	55.77	75	44.23	92	176.92	12	3.08
Average	14.50	27.88	7.50	72.12	46.00	88.46	6.00	1.54

TABLE 5
Frequency Distribution of Knowledge Of Kesgilut Maintenance About The Timing Of Dental Examinations Before And After Education

Question	Before				After			
	Correct		Wrong		Correct		Wrong	
	Σ	%	Σ	%	Σ	%	Σ	%
1.When is the recommended time to visit a dental clinic?	25	48.08	27	51.92	51	98.08	1	1.92
2.What do you do when you have a toothache?	25	48.08	27	51.92	50	96.15	2	3.85
3.What is the purpose of having your teeth and mouth checked at a dental clinic?	14	26.92	38	73.08	47	90.38	5	9.62
Total	64	123.08	92	176.92	148	284.62		15.38
Average	21.33	41.03	30.67	58.97	49.33	94.87		5.13

TABLE 6 shows that the knowledge of respondents before counseling on the maintenance of kesgilut with dental puppet media, most of them were in the poor category (46.92%). After being given counseling on maintaining kesgilut with dental puppet media, respondents experienced an increase so that the knowledge category became good (90.48%). Statistical Test Results of dental puppet as an Educational in pre and post counseling increased the awareness of second grade students of SDN Bendul Merisi Surabaya in maintaining their health.

The statistical test results of the Wilcoxon Signed Rank Test that have been calculated previously, resulted in a sig value of 0.000, presented in TABLE 7 Considering that 0.000 <0.05, it can be concluded that H0 is rejected and H1 is accepted, this shows that there is a considerable difference in the participants' knowledge before and after counseling on maintaining kesgilut when using dental puppet media. The use of dental puppet media in counseling has been proven to be successful in increasing awareness of maintaining teeth and lips in children in grade II SDN Bendul Merisi Surabaya.

As demonstrated in the table above, there is a clear improvement in the students' knowledge regarding oral hygiene after the intervention using dental puppets. Definition and Purpose of Oral Hygiene: The average score for correct answers improved from 71.79% in the pretest to 94.23% in the posttest, indicating a significant enhancement in understanding. Understanding and Goals of Oral Hygiene: Scores rose from 38.46% to 88.46%, showing a notable increase in awareness regarding the objectives of maintaining oral health.Proper Brushing Technique: Knowledge regarding brushing techniques increased from 31.25% to 84.13%, reflecting a significant improvement in practical skills.Tools and Materials for Brushing: The average score increased from 60.77% to 92.69%, indicating better knowledge of what is needed for proper oral hygiene.Understanding of Brushing Materials: There was a substantial rise in knowledge from 27.88% to 88.46%, demonstrating the effectiveness of the puppet intervention.Knowledge of Dental Check-up Timing: Students improved from 41.03% to 94.87%, showing a significant understanding of when to have dental check-ups. Overall Knowledge Level: Before the intervention, 46.92% of students fell into the 'poor' knowledge category. After the intervention, this figure decreased dramatically to 90.48% in the 'good' knowledge category.

TABLE 6
Recapitulation of Knowledge of Health Maintenance Before And After Education

No.	Question	Respondent's Answer Correct	
		Before	After
1.	Definition of dental hygiene maintenance and definition, purpose of tooth brushing	71,79	94,23
2.	Frequency and timing of tooth brushing	38,46	88,46
3.	The right way to brush your teeth	31,25	84,13
4.	Toothbrushing tools and food what is good and not good for kesgilut	60,77	92,69
5.	Tooth brushing materials	27,88	88,46
6.	Dental checkup time	41,03	94,87
	Total amount	938,46	1809,62
	Average	46,92	90,48
	Knowledge Criteria	Less	Good

TABLE 7
Statistical Results of The Wilcoxon Test for The Effectiveness Of Oral Health Maintenance Education with Dental Puppet Media

Variables	Z	P
Before - After	-6.295	0,000

IV. DISCUSSION

A. INTERPRETATION OF THE RESULT

The findings of this study reveal a substantial improvement in the oral health knowledge of second-grade students at SDN Bendul Merisi Surabaya following an educational intervention using dental puppet media. Prior to the intervention, many students exhibited limited understanding regarding essential oral hygiene practices. This is reflected in the pretest scores where only 46.92% of the participants fell into the “good” knowledge category. However, following the intervention, this percentage surged to 90.48%, indicating that the puppet-based education significantly enhanced the students’ awareness. Detailed analysis across six knowledge domains including understanding of oral health, brushing frequency and timing, techniques for brushing, suitable tools and food, toothpaste composition, and dental check-up timing demonstrated improvement in all areas. Notably, understanding of the proper way to brush teeth improved from 31.25% to 84.13%, and knowledge about brushing materials increased from 27.88% to 88.46%. The statistical significance of these results was confirmed by a Wilcoxon signed-rank test ($p = 0.000$), reinforcing that the observed changes are not attributable to chance. These outcomes suggest that puppet

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media functions not only as an engaging medium but also as an effective method for translating complex health information into age-appropriate messages. The use of storytelling and interactive demonstration likely contributed to increased retention and comprehension among the students.

B. COMPARISON WITH PREVIOUS STUDIES

The improvement in knowledge following the use of dental puppets aligns with findings from several previous studies. Nurhuda (2021) also reported a significant increase in tooth brushing knowledge among young children after receiving puppet-based health education, reinforcing the utility of puppetry in pediatric settings [38]. Similarly, Julianti et al. found that students who were educated with dental puppets displayed higher levels of engagement and information retention compared to traditional lecture methods [39]. Educational media involving visual and tactile elements have been consistently shown to enhance comprehension in early childhood learning environments [40]. Claudia et al. [41], in a study examining the use of animated videos, found that combining visuals with interactivity led to greater improvements in knowledge. Although videos are effective, puppets may offer additional advantages through physical presence and real-time interaction, which are particularly beneficial for kinesthetic learners. Moreover, this study supports the theoretical framework established by Notoatmodjo, which emphasizes that knowledge acquisition is enhanced when learners actively engage with the content using multiple senses [42]. Dental puppets provide auditory, visual, and kinesthetic stimulation, helping children to understand brushing techniques, dental examination routines, and the importance of fluoride-containing toothpaste. In contrast to studies that utilized pamphlets or didactic sessions, which often resulted in limited knowledge gains [43], the puppet-based approach in this study yielded a more significant and broad-based improvement across all measured domains. These findings suggest that integrating creative educational media into school curricula could offer a more sustainable approach to promoting oral health awareness.

C. LIMITATIONS AND IMPLICATIONS

Despite the positive results, this study is not without limitations. First, the study employed a pre-experimental design without a control group, limiting the ability to attribute the observed knowledge gains solely to the intervention. Future studies should consider randomized controlled trials to strengthen causal inferences. Second, the short-term nature of the assessment presents a limitation in evaluating the retention of knowledge over time. Although posttest results immediately after the intervention were promising, it remains unclear whether these knowledge gains will persist beyond a few weeks. Longitudinal studies are necessary to assess whether students maintain and apply this knowledge in their daily routines. Another limitation lies in the scope of behavioral outcomes. While knowledge was assessed in detail, the study did not measure whether increased knowledge translated into improved toothbrushing behavior or reduced debris index in the long term. Future research should incorporate objective measures such as oral hygiene indices or parental reports to determine behavioral impact. In terms of implications, the study underscores the importance of integrating interactive health education tools into early school curricula. The use of dental puppet media offers a low-cost, scalable, and culturally adaptable solution to enhance oral health knowledge among children. Given the accessibility and simplicity of puppet media, it holds potential for widespread implementation in both urban and rural educational settings, particularly where conventional dental education resources are lacking. Furthermore, collaboration with school health programs and local health authorities, such as the Puskesmas (Community Health Centers), could amplify the reach and effectiveness of puppet-based education. Regular integration of puppet shows during school health campaigns could contribute to sustained awareness and practice of oral hygiene. In conclusion, the significant increase in knowledge observed in this study supports the continued use and development of dental puppet media as a pedagogical tool. While further validation through robust study designs is warranted, the current evidence suggests that puppetry may serve as a powerful medium for child-centered health promotion.

V.CONCLUSIONS

This study aimed to evaluate the effectiveness of dental puppets as an educational tool in improving oral health knowledge among second-grade students at SDN Bendul Merisi Surabaya. Prior to the intervention, a significant proportion of students exhibited limited understanding regarding proper oral hygiene, with only 46.92% classified in the “good” knowledge category. Following the puppet-based educational intervention, this number rose markedly to 90.48%, indicating a substantial improvement. More specifically, knowledge related to the definition and purpose of tooth brushing increased from 71.79% to 94.23%, brushing frequency and timing improved from 38.46% to 88.46%, and knowledge of proper brushing technique rose from 31.25% to 84.13%. Additionally, understanding of brushing materials increased from 27.88% to 88.46%, and awareness of the timing for dental check-ups grew from 41.03% to 94.87%. These outcomes were statistically validated using the Wilcoxon signed-rank test, yielding a significant p-value of 0.000 ($p < 0.05$), thereby confirming the effectiveness of the intervention. The findings demonstrate that dental puppets serve not only as an engaging medium but also as an impactful educational strategy for young learners. The success of this approach highlights the importance of incorporating age-appropriate, interactive media into oral health promotion programs, particularly in primary schools. For future research, it is recommended to conduct longitudinal studies to assess knowledge retention and behavioral changes over time. Moreover, comparing the effectiveness of puppet-based interventions with other educational tools such as videos, games, or mobile applications could offer insights into optimizing oral health education methods for different age groups and learning styles.

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DATA AVAILABILITY
No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION
M.Y. Putri contributed to the conception and design of the study, supervised the educational intervention, and led the manuscript preparation. R. Larasati was responsible for data collection, statistical analysis, and drafting of the methodology. S. Prasetyowati contributed to the literature review, interpretation of results, and revision of the manuscript. A. Ansari assisted in refining the research design and contributed to language editing and critical review of the final manuscript. All authors reviewed and approved the final version.

DECLARATIONS
ETHICAL APPROVAL
Ethical approval was obtained from the relevant institutional review board. Informed consent was obtained from all participants and their guardians.

CONSENT FOR PUBLICATION PARTICIPANTS.
Consent for publication was given by all participants.

COMPETING INTERESTS
The authors declare no competing interests.

REFERENCES
[1] K. Yao et al., "Assessment of oral health behavior, knowledge and status among dental and medical undergraduate students," *BMC Oral Health*, vol. 19, no. 1, 2019.
[2] R. Abed et al., "Family impacts of severe dental caries among children," *Int. J. Environ. Res. Public Health*, vol. 17, 2020.
[3] P. Geetha Priya et al., "Effectiveness of school dental health education: A systematic review," *Indian J. Dent. Res.*, vol. 30, no. 3, 2019.
[4] K. Boustedt et al., "Tooth brushing habits and early childhood caries," *Eur. Arch. Paediatr. Dent.*, vol. 21, 2020.
[5] T. van Houwelingen et al., "Educational intervention to increase nurses' knowledge," *Nurse Educ. Pract.*, vol. 51, 2021.
[6] T. Shruti et al., "Storytelling as a method of oral health education," *Int. J. Clin. Pediatr. Dent.*, vol. 14, no. 3, 2021.
[7] Y. Choo et al., "Digital vs oral storytelling: Analysis," *Univers. J. Educ. Res.*, vol. 8, no. 5A, 2020.
[8] N. Hidayati, "Storytelling: One Package Learning," *J. Auladuna*, vol. 2, 2019.
[9] W. Tri et al., "Effect of storytelling on dental hygiene," *Adv. Health Sci. Res.*, vol. 27, 2020.
[10] T. Thomopoulou et al., "Storytelling in healthcare settings," *Int. J. Caring Sci.*, vol. 17, no. 1, 2024.
[11] M. Yuliana Putri et al., "Effectiveness of Puppets as Educational Tool," *Int. J. Adv. Health Sci. Technol.*, vol. 4, no. 5, 2024.
[12] S. Prasetyowati et al., "Improving oral health knowledge with puppet media," *J. Dent. Educ.*, vol. 87, no. 1, 2023.
[13] R. Kumar et al., "Behavioral approaches in pediatric oral health education," *Pediatr. Dent. J.*, vol. 31, no. 2, 2022.
[14] S. Al-Abdullah et al., "Innovative media for dental hygiene education," *J. Oral Sci.*, vol. 64, no. 3, 2022.
[15] Y. Ade and L. Hermanto, "Visual storytelling in children's illustration," *Asian J. Educ. Soc. Sci.*, vol. 1, no. 1, 2019.
[16] A. Hardiyanti, "Design of safe puppet models," *J. Kreatif Anak*, vol. 6, no. 2, 2020.
[17] L. Bietti et al., "Storytelling as adaptive collective sensemaking," *Top. Cogn. Sci.*, vol. 11, no. 4, 2019.
[18] D. Atmoko et al., "Kesgilut awareness in Indonesian schools," *J. Public Health Educ.*, vol. 8, no. 2, 2022.
[19] M. Wijayanti and L. Rahayu, "Oral health promotion in schools," *J. Kesehatan Gigi Indonesia*, vol. 5, no. 3, 2021.
[20] S. Saputri, "Nutrition and oral hygiene in children," *J. Gizi dan Kesehatan*, vol. 13, no. 1, 2021.
[21] T. Rokhmawan et al., "Oral storytelling in the classroom," *Bull. Community Engagem.*, vol. 2, no. 2, 2022.
[22] A. Adam et al., "Pendidikan kesgilut pada anak," *J. Promkes*, vol. 9, no. 4, 2021.
[23] M. Kusumawardani et al., "Media pembelajaran interaktif di sekolah dasar," *J. Media Edukasi*, vol. 7, no. 1, 2020.
[24] L. Rahmawati et al., "Penerapan media boneka gigi," *J. Kesehatan Anak Sekolah Dasar*, vol. 2, 2021.
[25] A. Emini et al., "Peningkatan pengetahuan dengan metode boneka," *J. Kesehatan Masyarakat*, vol. 11, 2022.
[26] S. Suryani et al., "Impact of puppet-based education," *Int. J. Health Promot.*, vol. 10, no. 2, 2023.
[27] T. Kongkaew et al., "Pretest-posttest study on learning intervention," *Thai J. Pharm. Sci.*, vol. 43, no. 4, 2019.
[28] C. Ma et al., "Objective outcome evaluation using pretest-posttest," *Appl. Res. Qual. Life*, vol. 14, 2019.
[29] G. Kumar et al., "Parental role in child oral health," *J. Indian Soc. Pedod. Prev. Dent.*, vol. 37, no. 1, 2019.
[30] E. Bernabe and W. Sabbah, "Dental caries and family impact," *Int. J. Environ. Res. Public Health*, vol. 17, no. 1, 2020.
[31] T. van Houwelingen et al., "Educational intervention to increase nurses' knowledge, self-efficacy and usage of telehealth," *Nurse Educ. Pract.*, vol. 51, p. 102924, 2021.
[32] M. Pay et al., "Knowledge, Motivation, and the Role of Teachers in Dental Health Behavior Among Elementary Students," *JDHT J. Dent. Hyg. Ther.*, vol. 2, no. 2, pp. 72–78, 2021.
[33] N. Hidayati, "Storytelling: One Package Learning in Improving Language and Character Education," *J. Auladuna*, vol. 2, 2019.
[34] L. Bietti et al., "Storytelling as Adaptive Collective Sensemaking," *Top. Cogn. Sci.*, vol. 11, no. 4, pp. 710–732, 2019.
[35] D. Fatmasari et al., "21-Day Oral Health Education Improves Brushing in Children and Parents," *J. Kesehatan Gigi*, vol. 7, no. 1, pp. 29–34, 2020.
[36] E. Herawati et al., "Interactive-Based Oral Health Learning in Primary Schools," *J. Pengabdian Masyarakat*, vol. 1, no. 4, pp. 111–118, 2022.
[37] T. Kongkaew et al., "Impact of Research-Based Learning in Pharmacoepidemiology: A One-Group Pretest–Posttest Study," *Thai J. Pharm. Sci.*, vol. 43, no. 4, pp. 236–241, 2019.
[38] Nurhuda, H. (2021). "Peningkatan Retensi Pengetahuan Menyikat Gigi Anak Melalui Terapi Boneka Tangan." Jurnal Ilmu Kesehatan Anak, vol. 5, no. 1, pp. 30-35.
[39] Julianti, J., Kristiani, A., & Sabilillah, M. F. (2022). "Media Boneka Bergigi Terhadap Pengetahuan Tentang Pemeliharaan Kesehatan Gigi Dan Mulut Pada Siswa." JDHT Journal of Dental Hygiene and Therapy, vol. 3, no. 1, pp. 1–5.
[40] Jelita, T. I., Hanum, N. A., & Wahyuni, S. (2021). "Pengaruh Pemutaran Video Animasi terhadap Pengetahuan Menyikat Gigi." Jurnal Kesehatan Gigi dan Mulut, vol. 2, no. 2, pp. 41–44.
[41] Claudia, C., Purwaningsih, E., & Ulfah, S. F. (2021). "Efektivitas Penggunaan Media Video Dalam Meningkatkan Pengetahuan Menyikat Gigi Yang Benar Pada Anak Sekolah Dasar." Dental Therapist Journal, vol. 3, no. 2, pp. 58–65.
[42] Notoatmodjo, S. (2018). Promosi Kesehatan dan Ilmu Perilaku. Jakarta: Rineka Cipta.
[43] Husna, N., & Prasko, P. (2019). "Efektivitas Penyuluhan Kesehatan Gigi Dengan Media Busy Book." Jurnal Kesehatan Gigi, vol. 6, no. 1, pp. 51–57.