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The Effectiveness of TURBODENT Educational Media in Improving Toothbrushing Skills in 5-6-Year-Old Children at Raden Paku Kindergarten, Surabaya

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ABSTRACT Toothbrushing skills in preschool children are crucial for dental health. However, children often struggle to apply the correct techniques. A preliminary study conducted on 5-6-year-old children at Raden Paku Kindergarten in Surabaya revealed that most of them had inadequate skills in performing toothbrushing movements. Educational media serve as an effective tool for conveying messages to enhance toothbrushing skills. This research highlights that the implementation of the interactive educational media TURBODENT (Try Using Box Dental) in early childhood education programs can significantly improve tooth brushing skills in preschool children, thereby potentially reducing the risk of dental problems in the future. This study aims to evaluate the effectiveness of the Try Using Box Dental media on the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten in Surabaya. This research employs a quasi-experimental method with a pretest-posttest control group design. The study sample consists of 40 children aged 5-6 years, divided into two groups: the intervention group and the control group. Data collection instruments include an observation checklist for toothbrushing skills. Data analysis techniques involve the Wilcoxon test and the Mann-Whitney test. Results: the Wilcoxon test for the intervention group shows a p-value of 0.000, while the control group has a p-value of 1.000. The Mann-Whitney test results in a p-value of 0.000 or < 0.05. The study concludes that the Try Using Box Dental media is effective in enhancing the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten in Surabaya.

INDEX TERMS Effectiveness, Dental Health Media, Toothbrushing Patterns

I. INTRODUCTION

Preschool children, typically aged between 3 and 6 years, often exhibit a strong imagination and a growing sense of independence, one aspect of which includes taking care of their dental health[1]. Toothbrushing skills are essential for maintaining oral health. The ability to brush teeth properly is crucial in preserving dental hygiene, as it helps keep teeth clean when appropriate techniques are used[2].

Toothbrushing is the simplest and most cost-effective preventive measure. Regular brushing can help reduce the formation of dental plaque. Additionally, reducing the consumption of foods and drinks containing sucrose is another preventive measure against tooth decay. Proper

and effective toothbrushing skills are crucial for maintaining oral health. One of the key factors influencing oral hygiene is knowledge of toothbrushing, which includes the frequency of brushing, the proper brushing technique, and the type of toothbrush used[3].

According to findings from the Indonesian Ministry of Health's research, only 1.4% of children aged five to six years are able to brush their teeth correctly[4]. This situation leads to a high prevalence of dental and oral health problems among children. Many preschoolers have poor oral hygiene due to their inability to brush their teeth properly[5].

Generally, children's oral hygiene is less satisfactory compared to adults because they are not as diligent in performing the movements necessary for cleaning their teeth after consuming sweet foods. Additionally, they still heavily rely on adults to ensure that they maintain good dental hygiene[6].

Initial survey results from observing toothbrushing skills in 5-6-year-old children at Raden Paku Kindergarten in Surabaya showed that 100% of the children were unskilled in toothbrushing. According to the head of Raden Paku Kindergarten, previous dental hygiene education had been conducted, but since the pandemic, the community health center (Puskesmas) responsible for supervision has not made further visits to conduct educational activities and dental check-ups, leaving the children without referrals from the Puskesmas.

Toothbrushing can be taught through dental health education. Dental health education is an effective means to enhance children's skills, aiming to achieve better dental health. During dental health education, children gain experiences and information through various educational media[7].

The goal of health education is to support behavior change in individuals. Establishing proper oral hygiene practices requires the application of knowledge gained through education, one of which is through educational outreach[8]. Dental health education aims to change people's knowledge, perceptions, and behaviors regarding dental hygiene. Media and game-based learning strategies are effective in altering children's oral hygiene habits. Educational games are more entertaining, engaging, challenging, and accessible to a wide audience compared to lecture methods using PowerPoint[9].

The success of dental health education efforts in school children is closely linked to the teaching methods and the crucial role of media, as it supports the learning process and makes it easier for children to understand the material. Through media, the messages conveyed can be more engaging and easier to grasp. Learning through play is an effective strategy for enhancing children's knowledge[10]. Playing is an engaging and enjoyable activity, performed voluntarily without pressure, with the aim of creating happiness and fun during play. Play plays a crucial role in a child's development, making it important for them to be given opportunities and attractive facilities in their play activities[11].

Using the Try Using Box Dental media is an effective educational tool for enhancing toothbrushing skills in children aged five to six years. This media can influence children's understanding, attitudes, and behaviors regarding early toothbrushing. The Try Using Box Dental media is a sticker card game that enhances children's engagement in the learning process. The visuals presented in this media are not only striking but also suitable for the cognitive development level of 5-6-year-old children. The content taught is easy for

children to understand. This approach, using such media, provides practical and significant experiences for children, enabling them to actively participate in understanding toothbrushing skills.

The Try Using Box Dental media focuses on teaching proper toothbrushing skills, consisting of only six cards, each with instructions that the respondents can read. Additionally, the Try Using Box Dental media is designed to make children more interactive and greatly enjoy playing the sticker card game for toothbrushing techniques, as its appearance is more attractive.

The preschool period is a crucial stage in a child's education for developing various skills, including toothbrushing skills. Lack of understanding during this time can hinder a child's ability to maintain dental health, particularly in toothbrushing practices. Children who face these challenges may be at risk of developing dental problems and poor oral hygiene[12].

The tendency of preschool children to use incorrect toothbrushing techniques and consume foods high in bacteria that are not promptly cleaned leads to poor oral hygiene. This is one of the factors that can cause plaque to accumulate on preschool children's teeth, ultimately resulting in tooth decay[13].

Toothbrushing is a mechanical method for removing plaque. The goal of toothbrushing is to clean the soft deposits on the surfaces of the teeth and gums, serving as a preventive step towards achieving ideal oral health and hygiene[14]. Providing appropriate education with engaging media on toothbrushing skills is the most effective way to ensure that children can apply the correct brushing techniques to control plaque buildup from an early age[15]. This is part of the effort to improve dental and oral hygiene from an early age in preschool children. Proper toothbrushing techniques are necessary to clean all tooth and gum surfaces without damaging the gum tissue or causing abrasion to the gums.

Based on the background described above, the objective of this study is to determine the effectiveness of TURBODENT (Try Using Box Dental) media on toothbrushing skills in 5-6-year-old children at Raden Paku Kindergarten, Surabaya.

II. METHOD

The research method applied is a quasi-experimental design with a Pretest-Posttest Control Group. The experimental study aims to explore the impact of the treatment deliberately implemented by the researcher, while the pretest-posttest design is used to compare conditions before and after the treatment. This study design can be illustrated as follows :

Pre-Test	Intervensi		Post-Test
KI	P1	I	P2
KK	P1	X	P2

FIGURE 1. Research Design Diagram

Description :

KI	: Intervention Group
KK	: Control Group
P1	: Pre-test
I	: Intervention
X	: No Intervention
P2	: Post-test

The selection of research samples is determined by the Purposive Sampling Technique which is based on certain assessments or criteria that are considered relevant by the researcher. Data collection was conducted through direct observation of the toothbrushing skills of 5-6-year-old preschool children at Raden Paku Kindergarten, Surabaya. A checklist was used as the instrument for data collection. Data analysis employed non-parametric techniques, specifically the Wilcoxon test, to compare changes before and after the intervention using the TURBODENT media (Try Using Box Dental) within the same group, or in other words, to test paired sample conditions (pre-post) and ordinal data. Additionally, the Mann-Whitney test will be used to compare the effects between the two groups.

During the implementation phase of the research data collection, the researcher adopted the behavioral change theory, which suggests that 21 days are needed to change a habit. This process is divided into three stages: introduction during the first seven days, repetition during the second seven days, and reinforcement during the third seven days. During the repetition and reinforcement stages, individuals can establish and maintain new habits[16].

III. RESULTS

This research was conducted in January 2024 at Raden Paku Kindergarten in Surabaya. Raden Paku Kindergarten is a private educational institution located at Klampis Ngasem 88a, Sukolilo, Surabaya. The study evaluated the effectiveness of the TURBODENT (Try Using Box Dental) media in improving toothbrushing skills among 40 preschool children aged five to six years at Raden Paku Kindergarten. The study comprised two groups: an intervention group and a control group, each consisting of twenty children.

TABLE 1

Frequency Distribution Based on Age and Gender in Raden Paku Surabaya Kindergarten in 2024

Category		Group					
		Intervention		Control		Sum	
		f	%	f	%	f	%
Age	5 years	4	20%	5	20%	9	22,5%
	6 years	16	80%	15	80%	31	77,5%
Gender	Male	10	50%	12	70%	22	55%
	Female	10	50%	8	30%	18	45%

Based on the data in **TABLE 1**, the majority of children are six years old (77.5%). Gender distribution is 55% male and 45% female.

TABLE 2

Frequency Distribution of Tooth Brushing Skills in Children Aged 5-6 Years Before Being Educated with TURBODENT Media at Raden Paku Kindergarten Surabaya in 2024

Categories Brushing Skills	Intervention Group		Control Group	
	f	%	f	%
Good	0	0%	0	0%
Moderate	0	0%	1	5%
Poor	20	100%	19	95%
Total	20	100%	20	100%

From **TABLE 2**, it can be seen that before using Try Using Box Dental media, all children in the intervention group had less brushing skills (100%). In the control group, 19 children (95%) also had less skills.

TABLE 3

Frequency Distribution of Brushing Skills in Children Aged 5-6 Years After Being Educated with TURBODENT Media at Raden Paku Kindergarten Surabaya in 2024

Categories Brushing Skills	Intervention Group		Control Group	
	f	%	f	%
Good	16	80%	0	0%
Adequate	14	20%	1	5%
Poor	0	0%	19	95%
Total	20	100%	20	100%

From **TABLE 3**, it can be seen that after getting education using Try Using Box Dental media there was an increase, most of the 20 children in the intervention group, namely 16 children (80%), had good brushing skills. However, there was no change in the control group.

TABLE 4

Wilcoxon Pre-test and Post-test Results of the Intervention Group at

Variable	Category		
	Good	Enough	Poor
Pre-Test	0	0	20
Post-Test	16	4	0
P value	0,000		

Raden Paku Kindergarten Surabaya in 2024

TABLE 4 supports the acceptance of H1 and rejection of H0 by showing that the Asymp Sig. (2-tailed) values of 0,000 < 0,05. The findings showed that the pre- and post-test outcomes for the intervention group were significantly impacted by the use of Try Using Box Dental media. Thus, it can be said that the media is a useful instrument for helping Raden Paku Surabaya Kindergarten students, ages 5 to 6, develop their brushing techniques.

As shown in **TABLE 5** the Asymp Sig. (2-tailed) values of 1,000 > 0,05, which means that the alternative hypothesis (H1) is rejected and the null hypothesis (H0) is supported. This suggests that there is no discernible change in the control group's brushing abilities pre- and post-test scores.

TABLE 5

Wilcoxon Pre-test and Post-test Test Results of Control Group at Raden Paku Kindergarten Surabaya in 2024

Variable	Category		
	Good	Enough	Poor
Pre-Test	0	1	20
Post-Test	0	1	20
P value	1,000		

TABLE 6

Mann-Whitney Test Results on Post-test Scores of Intervention Group and Control Group in Raden Paku Kindergarten Surabaya in 2024

Variable	Category	
	Intervention	Control
Good	16	0
Moderate	4	1
Poor	0	19
P value	0,000	

TABLE 6 displays the results of the post-test on brushing abilities between the intervention and control groups. A p-value of $0.000 < 0.05$, was obtained. This shows that the alternative hypothesis (H1) was accepted and the null hypothesis (H0) was rejected. This suggests that, in comparison to the control group, which did not receive therapy, the intervention group's brushing skills were improved with the use of Try Using Box Dental media.

IV. DISCUSSION

Based on the research data, the toothbrushing skills of the intervention group were categorized as inadequate before receiving education with the Try Using Box Dental media. In contrast, the control group showed varied results in their toothbrushing skills before the education with the Try Using Box Dental media. Although the majority of respondents in the control group fell into the inadequate category for toothbrushing skills, there was one respondent who was categorized as having sufficient toothbrushing skills.

Generally, the respondents performed toothbrushing movements using vertical or horizontal patterns, often neglecting the inner surfaces of the teeth and the tongue. Lack of supervision and guidance from parents or caregivers also played a role, resulting in children not practicing optimal toothbrushing techniques. Additionally, the lack of motivation and understanding of the importance of proper toothbrushing techniques contributed to the low toothbrushing skills observed in preschool children.

This is consistent with the study conducted by Gestina and Meilita in 2020, which concluded that children with extensive knowledge about dental health tend to adopt healthy behaviors, including brushing their teeth with the

correct technique, compared to those with limited knowledge[17]. This aligns with field findings from Aprilia et al. in 2021, who discovered that many children only brush certain parts of their teeth or do not follow proper procedures, leading to poor hygiene and even dental problems[18]. These findings are also in line with research by Putra and Kasiyati (2019), which identified stagnant data patterns and a lack of brushing skills among children before receiving interventions to enhance their toothbrushing abilities. In addition to their inability to clean their teeth properly, children were observed brushing their teeth carelessly, performing the toothbrushing activity haphazardly[19].

Preschool children should receive continuous education on dental and oral health. This education aims to inform young children about the importance of maintaining dental and oral health. Preschool-aged children have the potential to develop motor skills effectively when engaged in age-appropriate activities that support their development[20]. According to Blum, supportive factors such as media and a conducive environment are necessary for knowledge and attitudes to be translated into concrete actions; one of these factors is the availability of facilities. In addition to facilities, support from other parties also plays a crucial role in realizing this goal [21].

Based on the research results on the toothbrushing skills of 5-6-year-old children after receiving education with the Try Using Box Dental media at Raden Paku Kindergarten, Surabaya, the intervention group showed improvement. In the post-test, most respondents were categorized as having good toothbrushing skills. The respondents demonstrated a strong interest in the Try Using Box Dental media due to its appropriate and engaging use in learning. This media is designed interactively, featuring card game elements and bright images, which capture the respondents' attention with its unique box design.

This is consistent with the findings of Ningsih *et al.* (2020) on the development of toothbrushing skills. The use of the smart card game model in their study was proven effective in enhancing children's toothbrushing skills, thereby reducing food residue buildup on children's tooth surfaces[22]. This also aligns with the research conducted by Farihah et al. (2022), which showed that the application of models and educational media, such as cards about dental and oral health maintenance, including toothbrushing techniques, impacts what children aged four to six years know. They learn to think critically, be active, and solve problems in this way, ultimately fostering a positive attitude[23]. Previous studies have demonstrated that providing information about toothbrushing practices can enhance children's understanding of the importance of maintaining their oral and dental health. This information can encourage children to learn better in the future[24].

In contrast, the research results on the toothbrushing skills of 5-6-year-old children in the control group showed no improvement in the post-test. The data remained flat,

with no increase in the toothbrushing skills of the control group children. This is consistent with the research conducted by Wicaksono et al. (2022), which found that dental and oral health education in schools is ineffective because it is often carried out inconsistently over time, making it difficult to establish habits in children. To strengthen children's focus, knowledge, and habits regarding dental and oral care, the use of engaging and interactive media, such as gamified card media, is necessary to teach children toothbrushing skills[9].

This is also consistent with the research by Pudentiana (2021), which notes that the lack of knowledge about correct toothbrushing techniques is often due to insufficient understanding and mastery of these techniques by the target audience, who have not been adequately exposed to them. Children often neglect their dental health due to negative behaviors. However, instilling awareness in children about the importance of applying proper toothbrushing skills indeed requires extra time and patience, and needs to be consistently applied in daily life to become a habit that lasts into adulthood[25].

The research findings indicate a significant difference in the use of the Try Using Box Dental media between the intervention group and the control group regarding the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten, Surabaya. Overall, the toothbrushing skills in the intervention group were better compared to the control group. The results show that the intervention group experienced a more significant improvement in toothbrushing skills compared to the control group.

The Try Using Box Dental media serves as a dental and oral health promotional tool to provide knowledge or information related to toothbrushing. This media creates an advantage by combining dental health education with playful learning. One of its standout features is the smart and engaging card game, played by sequencing the cards and attaching them to the box board. Each card is equipped with clear images and instructions on the correct toothbrushing techniques/steps. Children are encouraged to place the cards in order according to their pairs, forming the correct sequence for toothbrushing. Additionally, Try Using Box Dental is also equipped with a dental phantom and mini toothbrush, helping children practice the toothbrushing steps more realistically and interactively after sequencing the cards. Thus, Try Using Box Dental not only provides effective learning about dental health but also offers a fun and interactive play experience for children.

When an individual has a high level of knowledge, their attention to maintaining dental and oral hygiene is also high. Additionally, the high prevalence of dental and oral diseases today is influenced by several factors, one of which is the public's lack of awareness of the importance of maintaining dental and oral hygiene[26]. A study by Jalante et al. (2020) states that oral hygiene in children may be influenced by their toothbrushing habits. Children who maintain good dental hygiene may have a lower risk of oral

diseases due to less food residue sticking to their teeth. This factor can be influenced by the type of food consumed by children and how well they maintain their dental hygiene[27].

Based on Skinner's theory (1938), behavior is described as an individual's reaction to external stimuli. According to Skinner, behavior is shaped through a process in which stimuli influence the organism, which then responds. This theory is well-known as the "S-O-R" theory, or Stimulus-Organism-Response[21]. Based on the S-O-R (Stimulus-Organism-Response) theory, behavior refers to an individual's response to a specific stimulus. In the context of this study, the stimulus is the information conveyed through the Try Using Box Dental media to the 5-6-year-old children at Raden Paku Kindergarten, Surabaya. The selection of appropriate media can enhance interest, strengthen concentration, and improve understanding during the education session. The use of Try Using Box Dental in the education significantly impacts behavioral change. Responses to stimuli are categorized into two types: closed behavior and open behavior. Changes in knowledge and attitudes occur in closed behavior, while changes in toothbrushing skills occur in open behavior. If the stimulus is well-received by the children, it will indirectly enhance their knowledge, stimulate interest, and potentially improve their toothbrushing skills, thereby maintaining oral cavity hygiene in preschool children and preventing dental and oral diseases.

V. CONCLUSION

The purpose of this study to evaluate the effectiveness of the Try Using Box Dental media on the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten in Surabaya. Based on the research on the effectiveness of the Try Using Box Dental (TURBODENT) media on the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten, Surabaya, in 2024, it can be concluded that before receiving education with this media, the toothbrushing skills of 5-6-year-old children were categorized as poor. However, after receiving education with TURBODENT media, their toothbrushing skills improved and were classified as good. This indicates that the TURBODENT media is effective in enhancing the toothbrushing skills of 5-6-year-old children at Raden Paku Kindergarten, Surabaya.

Recommendations for further research are to provide training to teachers or parents to use Try Using Box Dental media so that teachers and parents can know about brushing teeth with good and correct techniques so that they can motivate their children from an early age.

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