Jurnal Info Kesehatan
Vol. 21, No. 1, March 2023, pp. 77-87
P-ISSN 0216-504X, E-ISSN 2620-536X
DOI: *10.31965/infokes.Vol21Iss1.938*
Journal homepage:*http://jurnal.poltekeskupang.ac.id/index.php/infokes*

RESEARCH **Open Access**

Compliance Level of PAUD Students in Brushing with the Interactive Calendar Guide

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Received: 11 Oktober 2022 Revised: 24 March 2023 Accepted: 25 March 2023

Abstract
Brushing teeth properly and correctly must be instilled in children from an early age so that they become accustomed to living a clean and healthy lifestyle. Dental health education can help people develop good brushing habits. Brushing your teeth in the morning and evening for 21 days is an interactive calendar designed to control the implementation of brushing your teeth in the morning and evening. The objective of this study was to assess PAUD (Pre-School) students' compliance with morning and night toothbrushing using an interactive calendar guide to brushing their teeth in the morning and evening for 21 days. The research method used is pre-experimental. Simple random sampling method was also administered. The research intervention was conducted on 32 PAUD Bahagia Sukapura and Al Abror students. A questionnaire and an interactive calendar sheet were used as research instruments. The results showed that before the intervention, the average score of PAUD children's compliance with brushing their teeth in the morning and evening was 46.9063, but after the intervention, it increased to 79.0313. Before the intervention, the level of adherence to brushing teeth in the morning and evening was in the less compliant category (40.6%), but after the intervention with an interactive calendar, it increased to (96.9%). The Wilcoxon Sign Rank Test analysis revealed a difference in pre- and post-intervention scores on children's compliance data in brushing their teeth using the morning and evening brushing calendar for 21 days, with a p-value (0.000) <0.05. Brushing their teeth twice a day in the morning and evening for 21 days is effective in increasing PAUD children's adherence to brushing their teeth twice a day in the morning and evening.

Keywords: Compliance, Morning and Evening Brushing, Interactive Calendar.

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1. INTRODUCTION

Efforts to maintain oral health in children are associated with oral hygiene status that impacts children's quality of life. The research results by Nuraini, Raharjo & Maharani, (2021) explained that most Indonesian children possess poor oral health. Good dental and oral health conditions influence children's overall health and well-being (Melo et al., 2021; Wijayanti & Rahayu, 2018). Dental and oral hygiene status in pre-school-age children can be enhanced through excellent and correct brushing habits (Wijayanti & Rahayu, 2018).

Basic Health Research, 2018 demonstrated that 1.1% of 86.7% of children aged3-4 years brushed their teeth properly every day, and 1.4% of 93.2% of children aged 5-9 years brushed their teeth properly every day (Kementerian Kesehatan Republik Indonesia, 2019). Lousy brushing habits can affect potential dental caries in children. The best time to brush teeth is in the morning, after breakfast, and before bed (Melo et al., 2018; Wijayanti & Rahayu, 2018). Parents play an important role in instilling the habit of brushing teeth at a young age because, in general, parents have sufficient knowledge to brush their own teeth. (De Jong-Lenters et al., 2019; Abadi & Suparno, 2019; Wanti et al., 2021). Based on their research results, George et al., (2019) recommend that parents should assist their children in brushing their teeth and supervise brushing until the child is ten years old. The manner of parenting also affects how the children accept the direction of behavior conveyed by parents (Mahmoud et al., 2017). Ineffective parenting is characterized by inconsistent and demanding discipline practices, which result in child disobedience and resistance. It may have a negative impact on children's compliance with brushing their teeth twice a day (Seeberger & Sampietro, 2021). Good parent-child relationships positively impact children's behavior (Kell et al., 2018).

In everyday life, children must brush their teeth in the morning and at night without feeling compelled to do so. Motivating children can assist them in achieving their goals actively and without coercion. Parents may choose to use educational media to instill discipline or obedience in their children (Ceyhan et al., 2018). An interactive calendar of brushing teeth morning and evening for 21 days may guide parents to generate children's habits to brush their teeth morning and night (Heriyanto et al., 2018; Pawarti & Abral, 2019).

The calendar for brushing the teeth in the morning and evening for 21 days is one of the programs designed by FDI (World Dental Federation) based on the theory of behavior change. Its objective is to establish the habit of brushing your teeth in the morning and evening (Melo et al., 2020). The results of previous studies also demonstrated that the morning and evening brushing calendar could enhance the habit of brushing teeth in the morning and evening in elementary school-age children (Heriyanto et al., 2018; Melo et al., 2018; Rahina et al., 2021). The difference in this study is that the respondents are PAUD students, and the interactive calendar type for brushing teeth in the morning and evening is adjusted for early childhood. The objective of this study is to examine PAUD students' compliance with brushing their teeth in the morning and evening using an interactive calendar guide that can be utilized as study material to enhance the habit of brushing teeth in the morning after breakfast and at night before bed in early childhood.

2. RESEARCH METHOD

This research is a pre-experimental study. In April - May 2022, the study sample consisted of PAUD Bahagia Sukapura and Al Abror students was conducted. The sample in this study consisted of all members of the population who met the criteria for research subjects. The sample size was determined using Isaac and Michael's formula, with a 5% margin of error (Sugiyono, 2020). The calculation of the sample obtained as many as 32 PAUD students.

Primary data were collected using research instruments such as questionnaires and interactive calendar sheets (figure 1). PAUD children's compliance is measured as follows: if

the child brushes his teeth twice a day on time, points = 4, only brushes his teeth once, points = 2, does not brush his teeth at all, points = 0. The interactive calendar sheet was filled out, and the scores were calculated and categorized as follows: 1) disobedient score (1-41), 2) moderately obedient score (42-63), and 3) compliant score (64-84).

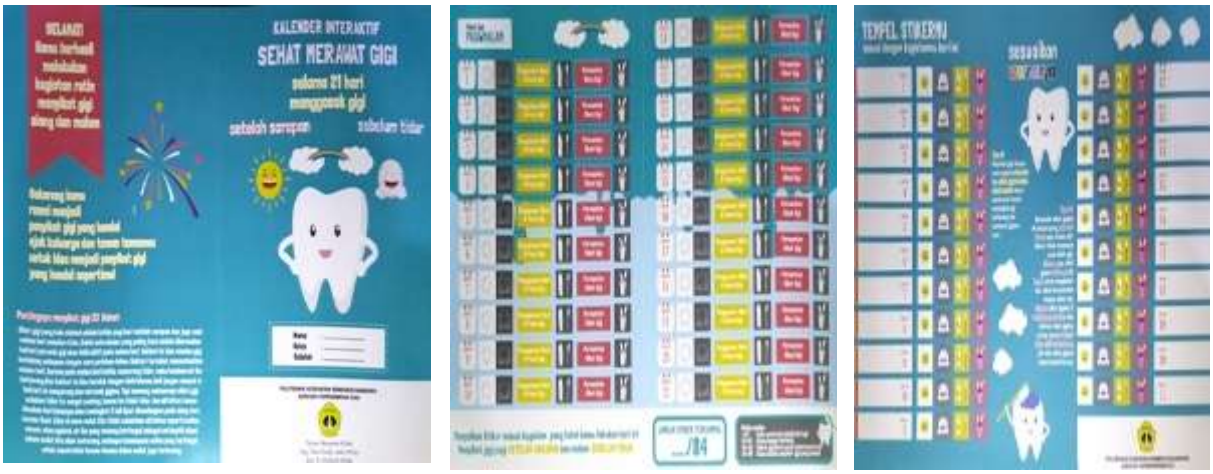

Figure 1. Interactive Calendar of Brushing Your Teeth Morning and Night 21 Days.

The research is conducted in a hybrid mode, that is, both offline and online. In the early stages, a pretest on the importance of brushing teeth morning and evening was administered, followed by an interactive calendar tutorial and offline counseling on the importance of brushing teeth morning and evening for parents of PAUD children. For 21 days, observations of children's teeth brushing activities in the morning and evening were conducted online via the WhatsApp group. The number of morning and evening toothbrushes was counted on the 21st day of the intervention to determine the level of obedience of PAUD children.

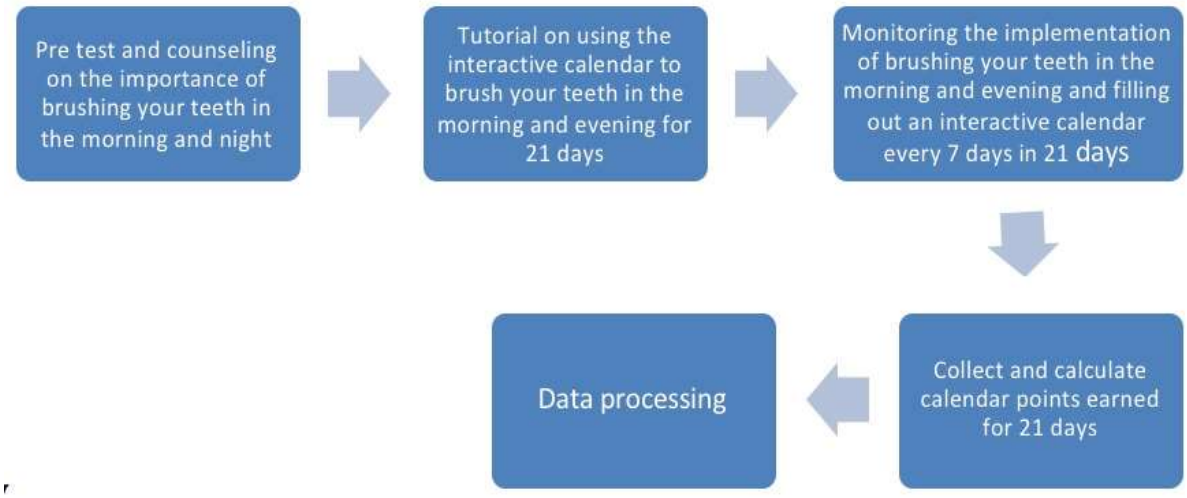

Figure 2. Research flow

Hypothesis testing in this study employed the *Wilcoxon Sign Rank Test* to perceive the effect of the intervention by employing an interactive calendar of brushing your teeth in the morning and evening for 21 days on adherence to brushing your teeth in the morning and evening. This research has received ethical clearance from the KEPK Poltekkes team at the Ministry of Health Bandung by 55/KEPK/EC/III/2022.

3. RESULTS AND DISCUSSION

This study observed the impact of morning and night brushing calendar guidelines on early childhood compliance with morning and night toothbrushing activities. The study included 32 PAUD children from PAUD Bahagia Sukapura and Al Abror, as well as their parents, who participated in the morning and night brushing of their teeth for 21 days. Table 1 demonstrates the demographic characteristics of respondents in PAUD Bahagia Sukapura and Al Abror based on age, with 21 children (65.6%) being children aged 3-4 years. There are 17 female students (53.1%) in the class. The education level of middle-class parents (SMA/SMK) is 19 (59.4%). The majority of parents' occupations (71.9%) are as private employees.

Table 1. Characteristics of respondents incorporate the age of the child, the gender of the child, the last education of the parents, and the occupation of the parents.

Categorical	Frequency	Percentage (%)
Child's age		
< 3 years	2	6.3
3 – 4 years	21	65.6
> 4 years	9	28.1
Child gender		
Male	15	46.9
Female	17	53.1
Parents' last education		
Elementary School	7	21.9
Secondary School	19	59.4
High School	6	18.8
Parents' occupation		
Civil servant	5	15.6
Private employee/self-employed	23	71.9
Housewife	4	12.5

Table 2. The level of children's adherence to the practice of brushing their teeth in the morning before and after the intervention.

Variable	Compliance level						
	Less Obedient		Obedient enough		Obey		Total
	Pre	Post	Pre	Post	Pre	Post	Pre/post
Child gender							
Male	7 (46.7%)	0 (0.0%)	8 (53.3%)	1 (6.7%)	0 (0.0%)	14 (93.3%)	100/100
Female	6 (35.3%)	0 (0.0%)	8 (47.1%)	0 (0.0%)	3 (17.6%)	17 (100%)	100/100
Parent's education							
Elementary	5 (71.4%)	0 (0.0%)	2 (28.6%)	1 (14.3%)	0 (0.0%)	6 (85.7%)	100/100
Secondary	7 (36.8%)	0 (0.0%)	12 (63.2%)	0 (0.0%)	0 (0.0%)	19 (100%)	100/100
High	1 (16.7%)	0 (0.0%)	2 (33.3%	0 (0.0%)	3 (50.0%)	6 (100%)	100/100

Table 2 demonstrates the percentage level of adherence to the implementation of early morning toothbrushing before utilizing the interactive calendar in boys who are less compliant by 46.7% and girls who are as many as 35.3%. After receiving an interactive calendar guide, boys' compliance increased nearly twofold to 93.3%. The majority of PAUD children with parents with a basic education level (71.4%) belonged to the category of children who were less obedient prior to the intervention using an interactive calendar. The achievement level of children's compliance after being given a guide to brushing their teeth in the morning and night

after the intervention appeared to have increased. There were no longer seen to be less obedient children, increased compliance following the intervention with the interactive calendar.

The following is a descriptive statistical value of the average and standard deviation of the measurement data for data on compliance with PAUD children in the implementation of toothbrushing using a calendar of brushing teeth in the morning and evening for 21 days:

Table 3. The results of the average score of children's compliance in brushing their teeth in the morning and at night.

	N	Minimum	Maximum	mean	Std. Deviation
Pre-Score	32	28.00	71.00	46.9063	11.23175
Post-Score	32	52.00	84.00	79.0313	6.96296

Table 3 illustrates as many as 32 samples of data on children's compliance scores in brushing their teeth. The results of the adherence score to brushing teeth in the morning and evening after being given the interactive calendar guide treatment for brushing varied between a minimum value of 28 to a maximum value of 71. The pre-adherence score data had an average score of 46.9063 and a standard deviation of 11.23175. The adherence score to brushing teeth in the morning and evening after treatment (interactive calendar of brushing teeth) ranged from 52 to 84. The pre-adherence score data had an average of 79.0313 and a standard deviation of 6.96296. The standard deviation value, which is less than the average in both groups of data, indicates that the data from the measurements taken is good because it is relatively uniform.

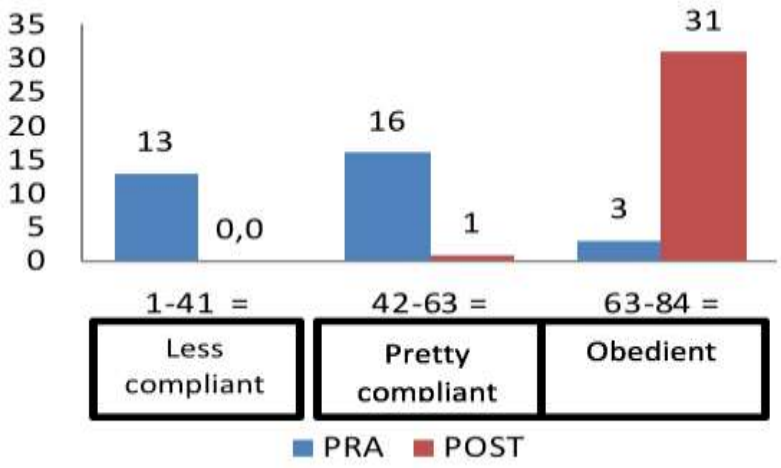

Figure 2. Students' Compliance with Brushing their Teeth Morning and Night.

Figure 2 illustrates that, for pre-data, 13 (40.6%) students are less compliant, while 16 (50%) students are fairly compliant. Meanwhile, the data after being treated (post) in the form of intervention using an interactive calendar of brushing teeth in the morning and evening revealed that as many as 31 students (96.9%) were compliant.

For 21 days, the Wilcoxon Signed Ranks Test was employed to compare pre-score and post-score data for children's compliance in brushing their teeth using the morning and evening brushing calendar.

Table 4. The Effect of Intervention Using an Interactive Calendar of Brushing Your Teeth Morning and Evening on Toothbrushing Habits in Bahagia Sukapura and Al Abror PAUD Students.

	N	Mean	Std. Deviation	Z	P	Information
Pre-Score	32	46.9063	11.23175	-4,939	0.000	Significant Test
Post-Score	32	79.0313	6,96296			(Different)

The Wilcoxon Sign Rank Test analysis test was employed to perceive the effect of the intervention utilizing an interactive calendar of brushing your teeth in the morning and evening for 21 days on adherence to brushing your teeth in the morning and evening. Table 4 illustrates the p-value (0.000) < 0.05, thus, it is possible to conclude that there is a difference in the pre-scores and post-scores of children's compliance data in brushing their teeth for 21 days using the morning and evening brushing calendar. According to the data scores, there is an increase in children's compliance scores in brushing their teeth using the morning and evening brushing calendar for 21 days.

The implementation of preschool (PAUD), according to the Regulation of the Minister of Education and Culture, should apply several levels of achievement of child development, incorporating maintaining a clean and healthy lifestyle for children and their environment. The development of character in early childhood is a thing parents has to pay attention (Mahat & Bowen, 2017; Mahmoud et al., 2017). Excellent and correct education shapes the character of early childhood. Auto activity education can be applied to early childhood health education to encourage children to be active and productive in their growth and development (Aulina, 2018).

This study's participants were children aged 3-5 years who attended early childhood education (table 1). Because children are still in the process of rapid growth and development at this age, it is referred to as the "golden age" (Aulina, 2018). Early childhood is a distinct person, a stage of life with distinct characteristics. Young children are quick to obey and have excellent memories. They are vulnerable to events in their environment, particularly children aged 0 to 5 years who attend preschool (Angelica et al., 2019). Dental health in early childhood requires attention as it is one part of a child's growth and development, emphasizing on prevention precedes treatment (Abadi & Suparno, 2019). Dental health should be practiced as early as possible so that it becomes a habit for children and adults alike. Brushing teeth on a regular and timely basis is typical of early childhood dental health behavior (Khan et al., 2021; Muhtar et al., 2020).

Table 2 illustrates that after the intervention, children's adherence to brushing their teeth in the morning and evening increased depending on the gender of the child and the level of education of the parents. Enhancing dental and oral health education, anticipatory guidance, and parental motivation can all influence children's dental health behavior (Manton, 2018). Educational factors, knowledge, attitudes, and behavior of mothers affect children's dental health (Mahat & Bowen, 2017; Mahmoud et al., 2017). Research by Khan et al., (2021) demonstrates that the mother's knowledge and attitudes can also influence children's understanding on the importance of brushing their teeth in the morning and at night. Research by Seeberger & Sampietro, (2021) demonstrates that the mother's knowledge of children's oral health is quite good and can affect the child's dental and oral health. This research is in accordance with the results of this study, in which 59.4% of the mothers of PAUD students owned the latest secondary education (SMA/SMK). The study by Angelica et al., (2019) demonstrated that a mother with higher education owns more knowledge about dental and oral health and is more aware of employing dental health services for children.

Research result Bramantoro et al., (2021) demonstrated that dental health education for early and pre-school children is crucial for further dental growth. The role of parents at home cannot be separated from children's obedience and discipline in brushing their teeth in the

morning and evening. Children who grow up in a healthy family environment with supportive parents, where each family member's role is present and harmonious, have better brushing habits than children who grow up in a less favorable family environment (Chandio et al., 2022; Soldani et al., 2018). Children at home can also obtain external motivation to brush their teeth in the morning and evening through parental support (Arora et al., 2021). Motivating children can also affect their tooth brushing behavior, with children who are motivated having better tooth brushing behavior. Children who lack motivation, on the other hand, are less likely to brush their teeth (Khan et al., 2021; Sumangando et al., 2022). The motivation to brush teeth can come from within a person (intrinsic) or from outside a person (extrinsic). The external motivation children obtain from parents and teachers to brush their teeth in a study conducted by Wanti et al., (2021) can affect the habit of brushing children's teeth.

According to the study's results presented in table 3, there is an increase in the average daily and evening tooth brushing compliance of PAUD students after a 21-day intervention involving an interactive calendar of brushing their teeth in the morning and evening. Before the intervention, PAUD students' average tooth brushing compliance was 46.9; after the intervention, it increased to 79.03. Figure 2 in this study indicates that after being given a guide to brushing their teeth in the morning and evening using an interactive calendar, as many as 31 (96.9%) children became obedient. The findings of this study are consistent with the findings of Melo et al., (2018), which demonstrated an increase in knowledge and changes in brushing behavior after using a toothbrush calendar for 21 days in elementary school-age children. The World Dental Federation (FDI) has also created an educational tool in the form of a calendar to help people brush their teeth in the morning and evening. The World Dental Federation (FDI) collaborated on the 21 Days Brush Day & Night program to implement dental and oral health education programs around the world. The 21 Days Brush Day & Night program is the third phase of a collaboration between the World Dental Federation (FDI) that focuses on education about brushing teeth twice a day with fluoridated toothpaste, with schools as the primary target (Melo et al., 2020).

Hypothesis testing using the Wilcoxon Sign Rank Test (p-value=0.000<0.05) demonstrated a significant difference before and after the intervention for the Bahagia Sukapura and Al Abror PAUD children. This final result is corroborated by a similar study conducted by Pawarti & Abral, (2019) that utilizes a toothbrushing calendar to influence the frequency of brushing teeth and dental and oral hygiene. Study by Heriyanto et al., (2018) regarding the interactive calendar of brushing teeth in the morning and evening for 21 days provides changes in brushing behavior in elementary school-age children. Brushing teeth in the morning and at night is something that children must do without being forced. Brushing your teeth not only means brushing them twice a day, but also brushing them at the appropriate time. Brushing your teeth is best performed each morning, after breakfast, and before bed. Based on the survey by Wijayanti & Rahayu, (2018), the research discovered that 55% of preschool and school-age children did not brush their teeth correctly.

Early childhood is still interested in visually exciting things. In several studies, it has also been proven that the use of visual media can escalate the effectiveness of children's education (Lestari et al., 2017). The morning and evening tooth brushing calendar has visually appealing features to attract children's attention. This calendar is intended to stimulate children so that they can appreciate their daily activities. Sticking stickers every time they brush their teeth in the morning and evening helps children feel responsible for brushing their teeth twice a day. Throughout the 21-day charging period, children will notice how the brushing calendar fills up with stickers every time they brush their teeth in the morning and evening, and they will look

forward to the rewards they will receive if they can fill all of the calendars. A small reward like this can help children develop the habit of brushing their teeth every morning and night from an early age (Abadi & Suparno, 2019).

Health education is identical to health education as both are oriented to behavior change. The success of dental health education efforts is inextricably linked to the educational methods and media employed (Lestari et al., 2017; Pawarti & Abral, 2019). Parents or teachers can utilize educational media to attract children's interest in dental and oral health (Belinda & Surya, 2021). Many educational media have been developed during this time period to support learning, whether it is to increase knowledge or form a behavior (Asyhar, 2012). One of the educational media that can be employed to shape the behavior of brushing your teeth in the morning and evening is this interactive calendar of brushing your teeth in the morning and evening for 21 days. The study by Rahina et al., (2021) revealed that after utilizing a calendar of brushing teeth in the morning and evening for 21 days, elementary school children became more diligent in brushing their teeth at the correct time, which is in the morning after breakfast and at night before going to bed. According to the findings of the researchers with PAUD children, an interactive calendar had an effect on improving teeth brushing skills.

Following the completion of the intervention, the results of interviews with parents of PAUD children received a positive response. Parents reported that their children were more disciplined about brushing their teeth twice daily, in the morning and at night. Parents also reported that their child's behavior had changed from not wanting to brush their teeth in the morning and at night. Everyday behaviors are recognized to be easier to develop into habits, and daily habits are more difficult to break or forget (De Vries, 2017). School-based interventions utilize behavioral theory can increase knowledge about dental and oral health in children (Zhou et al., 2019). Childhood is an excellent time, frequency, and method of tooth brushing to introduce the good habit of brushing teeth because children are more receptive, and their personality develops alongside mental maturation, increasing the likelihood of the habit being maintained for life.

4. CONCLUSION

Brushing teeth in the morning and evening for 21 days using an interactive calendar guide can increase adherence to brushing teeth in the morning and evening in Bahagia Sukapura and Al Abror PAUD students. Our findings revealed a significant increase in adherence to brushing teeth in the morning and at night.

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