

## The Effect of Dental Board Games Media on Children's Knowledge and Skills in Teeth Brushing

Listy Tawwabin Putri Pahargyaning Budi<sup>1</sup>, Wahyu Riyaningrum<sup>1</sup>

<sup>1</sup>Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto

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### ABSTRACT

*The results from the Indonesian Health Survey in 2023 showed that the prevalence of people experiencing dental health problems is 46.70%, including children's aged 5-10 years. Increasing knowledge and skills on how to brushing teeth can be done through education using game media. Data on dental problems at Puskesmas Belik states that there are 138 (90%) kids at grade 4 SD & MI children across Desa Badak who require more intensive dental care. This study used a pre-experimental design with pre-test and post-test groups. The pre-test was conducted before the brushing teeth education and the post-test was conducted seven days after the education. The sample in this study was 42 respondents aged 9-11 years at SDN 3 Badak. Data were collected using questionnaires and observation sheets. Children's knowledge increased from an average of 7,90 to 10,00 ( $p = 0.000$ ), as did skills increased from 7,14 to 17,00 ( $p = 0.000$ ). There is an influence of dental board games media on children's knowledge and skills in brushing their teeth ( $p = 0.000$ ). Education about teeth brushing techniques using dental board games media prove that it can increasing knowledge and skills among children's.*

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#### Corresponding Author:

**Wahyu Riyaningrum**

Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto

Soepardjo Rustam Street KM. 7, Banyumas, Indonesia

Email: [wahuriyaningrum@gmail.com](mailto:wahuriyaningrum@gmail.com)

## 1. INTRODUCTION

The basic ability of humans in order to fulfill their personal needs is to take care of themselves or what is commonly referred to as personal hygiene. This is part of Perilaku Hidup Bersih Sehat (PHBS) which is carried out on the basis of self-awareness in order to stay healthy and active in the community. One of the important aspects of personal hygiene is maintaining cleanliness oral and dental health (Cahyaningtyastuti et al., 2020).

Brushing teeth is the easiest thing that can be done by all age groups. The introduction of the habit of the right way to brush teeth can be done when children have entered elementary school, because in this age range children tend to face problems with their teeth and mouth because of the transition between baby teeth to permanent teeth (Anggraeni et al., 2022).

World Health Organization (WHO) reports that in recent years dental and oral health has made significant progress but in the case of dental caries is still one of the world's major problems in the field of dental and oral health, it is estimated that around 2.3 billion people suffer from permanent dental caries and among these there are 530 million sufferers who are children of primary school age (Tortora et al., 2023). According to data from Riset Kesehatan Dasar (RISKESDAS) in 2018, 57.6% of the Indonesian population experienced dental health

problems such as tooth damage/cavities/disease (Rusmawaty et al., 2024). The age group with the highest prevalence is children aged 5-9 years reaching 67.3% followed by the age group of 10-14 years old with 55.6% (Jalil et al., 2023). The prevalence of Central Javanese people who experience dental health problems such as decayed, cavities or pain is 42.8%. Pemalang Regency recorded a 46.70% percentage of people with dental problems, including children in the age group of 5-9 years old at 53.51% (Kemenkes, 2023).

Factors that greatly affect dental and oral health are the correct practice of brushing teeth including the frequency of time, techniques when brushing teeth and the appropriate shape of the brush when used on children. The benefits of knowing the habit of brushing teeth properly so that children understand that brushing teeth can prevent bacteria from developing in the dental cavity and avoid health problems in these areas (Dewanti et al., 2023).

Increasing knowledge in elementary school age children about the correct procedures for brushing teeth must certainly be done as an effort to prevent the occurrence of dental and oral diseases. The material presented must be appropriate for the age target to be effective in changing a habit (Saidah & Isnri, 2022). Knowledge can be obtained from providing health promotion education using media that can attract children's interest in maintaining their dental and oral health (Razakek et al., 2024).

Health promotion needs to be supported using appropriate methods, the most often applied in carrying out health promotion to children is with game media because the material is easier to convey by bringing joy when learning, stimulating the brain, increasing knowledge and confidence as well as beneficial for the growth and development of school-age children, game media is designed to include educational elements so that children's creativity and thinking patterns develop well (Loudoun et al., 2022).

Board games are a practical step in order to implement health promotion for children of primary school age, in addition to having visual board games help train children's motor skills with demonstrations designed in the game (Hasnah et al., 2023). The ideal time to train gross and fine motoric skills are when children entering primary school age. Detailed and correct instructions on how to brush teeth using simple techniques are needed so that it can be well understood by all (Elsa et al., 2023).

Researchers conducted a preliminary study at SD Negeri 3 Badak through interviews with grade 4 teachers, and found that 6 out of 10 students (60%) experienced problems with teeth such as yellow teeth, cavities, gums and nausea when drinking cold water. Education about dental health continues to be carried out by classroom teachers by simulating good and correct tooth brushing activities and reminding students to be diligent in brushing their teeth, but education using dental board games has never been carried out.

Based on the above background description, the researcher is interested in conducting research on "The Effect of Dental Board Games Media on Children's Knowledge and Skills in Teeth Brushing".

## 2. RESEARCH METHOD

This study employed a pre-experimental design using a one-group pre-test and post-test approach. The pre-test was administered before the educational intervention on toothbrushing techniques, while the post-test was conducted seven days after the intervention. The educational intervention was delivered to children using *dental board game* media. The research design can be described as follows: the first stage ( $O_1$ ) involved the pre-test, followed by the intervention (X), and concluded with the post-test ( $O_2$ ).

The study was conducted from December 2024 to January 2025 at SDN 3 Badak, Belik, Pemalang. Data were collected using two research instruments: a questionnaire assessing student's knowledge of toothbrushing and an observation sheet evaluating their toothbrushing skills. The study population consisted of fourth-grade students at SDN 3 Badak, aged approximately 9 to 11 years. Sampling was performed using a total sampling technique, in which all students of the population were included as respondents.

The *dental board game* educational media were validated by both material and media experts. The media validation, conducted on December 6, 2024, by Esti Nastiti Handayani, S.Pd., yielded a total score of 93%, indicating a very good category and suitability for use without revision. The material validation was carried out on December 9, 2024, by Ns. Yolinda Suciliyana, S.Kep., M.Kep., Sp.Kep.K., and obtained a total score of 90%, suggesting that the media were appropriate for use with minor revisions.

Ethical approval for this research was obtained from the Research Ethics Commission of the Bachelor of Nursing Study Program, Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto, under registration number KEPK/UMP/98/I/2025.

## 3. RESULT AND DISCUSSION

Based on the research, the following results were obtained:

### 3.1. Characteristics Respondents

The characteristics of respondents in this study including gender, age, habits of brushing teeth in a day and habits of consuming sweet foods in 1 week, which are presented in full as follows:

Table 1. Distribution of the Characteristics of respondents

No	Respondents Characteristics	Frequency (f)	Percentage (%)	
1.	Gender	Man	25	59,5
		Woman	17	40,5
2.	Age	9	11	26,2
		10	25	59,5
		11	6	14,3
3.	Habits of Brushing Teeth in a Day	2 times	35	83,3
		3 times	7	16,7
4.	Habits of Consuming Sweet Food in 1 Week	1-5 times	30	71,4
		6-10 times	12	28,6
Total		42	100	

Table 1 shows that the majority of male respondents were 25 children (59.5%). The majority of the age of grade IV students are the age of 10 years, was 25 respondents (59.5%). The habit of brushing their teeth in a day in grade IV students of SDN 3 Badak is that the majority of them brush their teeth 2 times a day as many as 35 respondents (83.3%). The average habit of the majority of children consuming sweet foods in a week is 1 to 5 times as many as 30 children (71.4%).

Good and correct toothbrushing behavior is the behavior of brushing teeth that is done every day, most Indonesian people have shown good and correct toothbrushing behavior, but only a few do it at the right time, specifically 2 times a day that is after breakfast and before going to bed at night (Umairahmah & Prasetya, 2024). Another study states that brushing teeth is good if it done by 3 times a day, that is after breakfast, after lunch and before going to bed at night (Kaur et al., 2023).

Children's preferences in choosing food are affected by taste, appearance, and packaging, which often make them interested in consuming snacks that are low in nutritional value. The habit of consuming sweet foods can trigger diseases and tooth decay, so the consumption of cariogenic foods needs to be limited. In 2015, the World Health Organization (WHO) stated that the ideal consumption of added sugar for children should not exceed 5% of their total daily energy intake (Ayu et al., 2023).

### 3.2. Frequency Distribution of Respondents Knowledge and Skills

The frequency distribution between knowledge and skills of respondents is presented in the table below as follows:

Table 2. Distribution of the frequency of respondents' knowledge and skills before and after being given dental *board games media*

Category	Pretest		Posttest		Frequency (f)
	Mean	Median	Mean	Median	
Knowledge	7,90	8,50	10,00	100,0	42
Skills	7,14	8,00	17,00	17,00	42

Based on the results of a questionnaire conducted to 42 respondents to measure the level of knowledge and skills of how to brush their teeth in children, it shows that the average value of knowledge at the time of the pre-test is 7.90, after being given intervention using dental board games media, children do a posttest and get an average score of 10.00. The average value of skills before dental board games education was 7.14 and after intervention increased to 17.00. The results obtained through filling out pretest and posttest questionnaires sheets were then tested to determine the effect of providing intervention using the *Wilcoxon Signed Rank Test*.

According to Piaget's theory of cognitive development, the intellectual development of children aged 6 to 12 years is the ability to receive and develop new knowledge about their mindset, emotions, language, and motoric skills (Wati et al., 2023). The difficulties experienced by school-age children in the habitual behavior of brushing their teeth properly and correctly can have an impact on the growth and strength of teeth. This can be caused by the lack of knowledge and skills of school-age children about the right way to brush their teeth, which is at least 2 times a day in the morning after breakfast and at night before bed, counseling about the behavior of brushing teeth habits with demonstration methods, practice and using educational games and directions from parents is very necessary (Septiani et al., 2023).

Children's tendency to choose food is usually influenced by various factors, such as the taste, appearance, and packaging. The more attractive the packaging of a snack served, the more it will attract the attention from children to consume it, even though the nutritional content is often not in accordance

with their needs. The habit of consuming sugary foods can also cause disease and be a major factor in the development of tooth decay, the consumption of cariogenic foods or sugary foods in children must be limited (Nurhaeni, 2020).

### 3.3. Frequency Distribution of The Effect of Dental Board Games Media

The table below presents the results of data analysis conducted using the *Wilcoxon Signed Rank Test*, which aims to determine the effect between knowledge and skills based on the data obtained:

Table 3. *Wilcoxon Signed Rank Test* Results of Knowledge and Skills Before and After Dental Board Games Media

Category	Knowledge	Skills	Mean	P-value	Frequency (f)
	Z	Z			
Pretest	-4,696	-5,654	17,78	0,000	42
Posttest			21,50	0,000	42

The statistical test was carried out using the *Wilcoxon Signed Rank Test*, in table 3 explains that the knowledge variable got a Z value of -4.696 and the skill variable got a Z value of -5.654 with an average pre-test score of 17.78 and posttest 21.50 which explains that there is an effect of dental board games media on the knowledge and skills of how to brush teeth in children based on the asymp.sig value  $p = 0.000$ .

This study shows that there is an increase after dental board games intervention regarding on knowledge of how to brush teeth in children, this study is in line with the previous research that shows effectiveness of Oral Hygiene with an increase in respondents' knowledge after health counseling treatment (Adam & Ratuela, 2022). However, the findings of this study are not in line with another study that states that there is no significant relationship between knowledge and behavior when caring for dental health in children, having extensive knowledge does not necessarily have good behavior in maintaining dental and oral health (Silitonga & Boyoh, 2024).

Variable of the skills abilities shows that there is an increase after being given dental board games media on how to brush teeth in children. Other research explained that in carrying out the prevention of diseases and damage to tooth and mouth is influenced by cognitive and affective factors, which means that respondents will have good skills if their knowledge is good (Aprilia et al., 2024).

The results of the study showed that there is an effect of dental board games media on knowledge and skills on how to brush teeth in children, in line with the previous other research states that education needs to be implemented with an interactive and fun methods, one of which is through the use of board games which can be an effective to approach during learning, game media as an educational tool can maximize children to receive new knowledge, improve concentration, patience, critical thinking skills, problem solving and develop social skills (Ghufon et al., 2024).

Health promotion through educational board games aims for children to have further knowledge about the importance of maintaining dental and oral health and develop skills when performing dental and oral hygiene care. The practice of maintaining dental and oral hygiene starts from the habit of brushing their teeth regularly every day after breakfast and before going to bed at night so that children can develop a sustainable healthy lifestyle.

## 4. CONCLUSION

This study showed a significant improvement in children's knowledge and toothbrushing skills after education using *dental board game* media, with a Wilcoxon test result of  $p = 0.000$  ( $<0.05$ ). The mean pre-test score increased from 17.78 to 21.50, proving the effectiveness of the intervention. Dental board games are therefore effective, engaging tools for improving oral hygiene knowledge and skills in elementary school children.

## REFERENCES

- Adam, J. d'Arc Z., & Ratuela, J. E. (2022). Tingkat Pengetahuan tentang Kebersihan Gigi dan Mulut Siswa Sekolah Dasar. *Journal of Public Health and Community Medicine*, 3(1), 1–7.
- Anggraeni, A. N. D. F., Prasetyowati, S., & Mahirawati, I. C. (2022). Tingkat Pengetahuan Menyikat Gigi Anak Sekolah Dasar Kelas 1-3 di Sdn 2 Sumberejo Kabupaten Trenggalek. *E-Indonesian Journal of Health and Medical*, 2(4). <http://ijohm.rcipublisher.org/index.php/ijohm>
- Aprilia, K., Yudiernawati, A., & Rachman, Moh. Z. (2024). Pengaruh Edukasi dengan Board Game terhadap Pengetahuan dan Kepatuhan Pencegahan Karies Gigi pada Anak Usia Sekolah. *Journal of Health Research Science*, 4(02), 328–335. <https://doi.org/10.34305/jhrs.v4i2.1213>

- Ayu, I. M., Sangadji, N. W., Putri, A. S., Indarg, A. P., Azuraa, S., Panjaitan, M. E. H., Syahrani, A. P., Purba, A. L., Hasanah, F., & Favianto, M. R. (2023). Edukasi tentang Pengaruh Kebiasaan Mengkonsumsi Makanan dan Minuman Manis secara Berlebih bagi Kesehatan. *Jurnal Abdimas Kesehatan (JAK)*, 5(3), 454–461. <https://doi.org/10.36565/jak.v5i3.421>
- Cahyaningtyastuti, M. P., Utami, B. S., & Prestiliano, J. (2020). Perancangan Board Game sebagai Media Pembelajaran tentang Pentingnya Merawat Gigi bagi Anak Usia Sekolah Dasar. *Jurnal Desain Komunikasi Visual Dan Intermedia*, 02(01), 41–52.
- Dewanti, T. M. G. A., Sugito, B. H., & Marjianto, A. (2023). Pengetahuan Menyikat Gigi yang Benar pada Siswa Kelas I Sdn Kertajaya 1-207 Surabaya. *E-Indonesian Journal of Health and Medical*, 3(3), 60–75. <http://ijohm.rcipublisher.org/index.php/ijohm>
- Elsa, S. A., Roslita, R., & Wisanti, E. (2023). Peningkatan Pengetahuan Menggosok Gigi yang Benar pada Anak Usia Sekolah melalui Edukasi Kesehatan Gigi dan Mulut dengan Media Video. *BIMIKI (Berkala Ilmiah Mahasiswa Ilmu Keperawatan Indonesia)*, 11(1), 46–55. <https://doi.org/10.53345/bimiki.v11i1.392>
- Ghufron, Moh. R., Mahirawatie, I. C., & N.P, I. G. A. K. A. (2024). Pemeliharaan Kebersihan Gigi dan Mulut Siswa Kelas 5 setelah Menggunakan Media Papan Game. *Jurnal Kesehatan Gigi Dan Mulut (JKGM)*, 6(2), 23–28.
- Hasnah, A., Kurniawati, D., Riolina, A., & Sari, N. D. A. M. (2023). Peningkatan Pengetahuan Kesehatan Gigi dan Mulut Anak Sekolah Dasar dengan Penyuluhan Menggunakan Media Dento Board Game. *Jurnal Pengabdian Masyarakat Medika*, 3(1), 11–15. <https://doi.org/10.23917/jpmmmedika.v3i1.1124>
- Jalil, Muh. A. S., Ningtyas, E. A. E., & Santoso, B. (2023). Dental and Oral Health Care Model in Pediatric Patient. *JDHT Journal of Dental Hygiene and Therapy*, 4(2), 146–153. <https://doi.org/10.36082/jdht.v4i2.1279>
- Kaur, G., Daryono, Purba, M. R., Watri, D., Setiawan, L. N., & Roselyn. (2023). Hubungan Frekuensi Menyikat Gigi dengan Kebersihan Gigi dan Mulut pada Anak Usia Sekolah. *Prima Journal of Oral and Dental Sciences*, 6(2), 30–36. <https://doi.org/10.34012/primajods.v6i2.4733>
- Kemendes, R. (2023). *Survei Kesehatan Indonesia 2023 dalam Angka*.
- Loudoun, F. M., Boyle, B., & Larsson-Lund, M. (2022). Children's Experiences of Play in Digital Spaces: A Scoping Review. *PLoS ONE*, 17(8), 1–17. <https://doi.org/10.1371/journal.pone.0272630>
- Nurhaeni. (2020). Konsumsi Makanan Manis terhadap Tingkat Kejadian Karies pada Anak Usia Sekolah (Studi Literatur). *Jurnal Media Kesehatan Gigi*, 19(2), 33–36.
- Razakek, N. F. S. A., Yusof, Z. Y. M., Yusop, F. D., Obaidellah, U. H., Kamsin, A., & Nor, N. A. M. (2024). Exploring Malaysian Schoolchildren's Perception of the Advantages and Disadvantages of the ToothPoly Board Game: A Qualitative Study. *Journal of Clinical Pediatric Dentistry*, 48(1), 101–110. <https://doi.org/10.22514/jocpd.2023.096>
- Rusmawaty, V. A., Sugito, B. H., & Edi, S. (2024). Level of Knowledge about Dental Health with Dental Caries. *International Journal of Advanced Health Science and Technology*, 4(4), 157–161. <https://doi.org/10.35882/ijahst.v4i4.393>
- Saidah, A., & Isni, K. (2022). Pengaruh Edukasi Kesehatan Mulut dan Gigi terhadap Tingkat Pengetahuan Anak di Kelurahan Rejowinangun, Yogyakarta. *The Indonesian Journal of Health Promotion*, 5(2), 205–210. <https://doi.org/10.31934/mppki.v2i3>
- Septiani, Wijayanti, D. R., Dewi, G. K., & Manik, S. E. (2023). Edukasi Kuman Gigi dan Mulut serta Cara Menyikat Gigi dengan Benar melalui Audiovisual di Taman Kanak-Kanak. *JMM (Jurnal Masyarakat Mandiri)*, 7(2), 1808. <https://doi.org/10.31764/jmm.v7i2.12875>
- Silitonga, L. F., & Boyoh, D. Y. (2024). Hubungan Tingkat Pengetahuan dengan Perilaku Perawatan Kesehatan Gigi dan Mulut pada Anak SD di Lab School UNAL. *Holistik Jurnal Kesehatan*, 18(2), 157–163. <https://doi.org/10.33024/hjk.v18i2.312>
- Tortora, G., Farronato, M., Gaffuri, F., Carloni, P., Occhipinti, C., Tucci, M., Cenzato, N., & Maspero, C. (2023). Survey of Oral Hygiene Habits and Knowledge among School Children: A Cross-Sectional Study from Italy. *European Journal of Pediatric Dentistry*, 24(3), 194–194. <https://doi.org/10.23804/ejpd.2023.1812>

- 
- Umairahmah, N., & Prasetya, F. I. (2024). Analisis Faktor yang Memengaruhi Perilaku Menggosok Gigi pada Anak: Literatur Review. *Jurnal Kesehatan Gigi Dan Mulut (JKGM)*, 6(2), 2024–2746.
- Wati, M. G., Samodra, T. J., Purnomo, E., Supriatna, E., Gustian, U., & Sofyan, D. (2023). Deskripsi Motorik Kasar Siswa Kelas Atas Sekolah Dasar Daerah Perbukitan. *Riyadhoh: Jurnal Pendidikan Olahraga*, 6(1), 16–21.