

*The 5<sup>th</sup> International Conference on Dental and Oral Health (ICODOH)*

**Dento Board Game : An Educational Media to Improve Fifth-Grade Students'  
Knowledge About Dental Caries**

**Rio Tanudirdja<sup>1\*</sup>, Ratih Larasati<sup>2</sup>, Ida Chairana Mahirawatie<sup>3</sup>**

*<sup>1,2,3</sup> Department of Dental Health, Polytechnic of Health Ministry health, Surabaya,  
Indonesia*

*\*Corresponding author: [riotanudirdja1063@gmail.com](mailto:riotanudirdja1063@gmail.com)*

**ABSTRACT**

**Background:** Oral and dental health are crucial factors affecting an individual's overall health. Untreated oral health issues among school-aged children can negatively affect their overall growth and development, leading to problems such as toothache, reduce participant in daily activities, increased school absenteeism and disrupted appetite. The problem in this study is the high rate of caries among fifth-grade student at SDN Kedungdoro V, Surabaya. **Object:** This study aimed to determine the level of knowledge about dental caries among fifth-grade students at SDN Kedungdoro V, Surabaya using dento board game. **Method:** This study is a descriptive research project with 52 students. Data were collected using questionnaires before and after the conseling session. Data analysis techniques were based on the questionnaires results. Score were obtained by summing the correct answer, dividing them by the total number of question, and then converting them into percentage, which were presented in tabular form. **Results:** The results of the research before counseling were carried out using the Dento Board Game, media were in the low category. Meanwhile, after counselling using Dento Board Game media, it was in the sufficient category.

**Keywords:** Knowledge, Caries, Dento Board Game

**BACKGROUND**

Dental and oral health is a vital issue that require attention because it has certain effects on the body. If left untreated, dental and oral health problems can potentially cause toothache, reduce a child's enthusiasm for activities, lead to school absences, reduce appetite, and even affect a child's growth and development (Fuadah et al., 2023).

According to the 2023 SKI ((SKI), 2023), the percentage of children aged 10-14 years who experience dental caries is 63.8% and the proportion of caries-free rates in the 10-14 year age group is 35.5%. The results of an initial survey by researchers on 10 student found that 8 students suffered from caries (80%), while 2 student were free from caries (20%). This shows that the prevalence of caries in 5<sup>th</sup>

grade students of SDN Kedungdoro V, Surabaya City is greater than the 2023 SKI, so this study focuses in the issue of the high prevalence of dental caries among 5<sup>th</sup> grade students of SDN Kedungdoro V, Surabaya City.

Various factors trigger the high prevalence of oral health problems, including insufficient knowledge and awareness regarding dental and oral health, especially the cause and prevention of tooth decay. A clear understanding of oral health can motivate individuals to care for their teeth to prevent tooth decay (Dwi Permatasari et al., 2023)

Knowledge arises from cognitive activity that occurs after an individual perceives an object through the sensory process. This process is carried out by the

five human senses, such as sight, hearing, smell, touch, and taste. Among these five senses, sight and hearing play a dominant role in contributing the most to human knowledge acquisition. Knowledge plays a central role in determining attitudes. (Overt Behavior) Aspects included in the cognitive domain are divided into six levels, namely: knowing, understanding, application, analysis, synthesis, evaluation (Mahendra et al., 2019)

Factors that influence this include tooth brushing routines, intensity, technique, and how to use toothpaste with its content fluoride. Furthermore, consuming a high sugar intake can impact teeth, such as cavities, which can contribute to bad breath. Another contributing factor is hydration commonly referred to as fluid intake. Adequate fluid intake is believed to help maintain oral moisture and reduce the risk of tooth decay (Dida, 2018) (Amalia et al., 2024).

Cavities are a form of tooth degeneration that begins in the enamel and spreads to the dentin, caused by a combination of several interrelated factors in the oral cavity, including dental factors, time, and microbes. Microorganisms are living organisms host. The presence of carbohydrates and the activity of microorganisms is characterized by the loss of tooth minerals, followed by the loss of organic matter (collagen, protein, polysaccharides, and mucopolysaccharides).

When microorganisms or microbes multiply and a person neglects their teeth and oral cavity, they cause plaque, caries, and loose teeth. As a result, bacterial aggression and decay of the pulp layer, along with the spread of inflammation affecting the tissue around the apex, can occur, ultimately leading to discomfort and pain (Hidayati et al., 2021) According (Amalia et al., 2024) to (DMF-T Index) Dental caries index is a numerical measure that reflects the level of dental caries disease.

Usage board game as a learning medium, it has been proven to be effective and efficient in supporting the learning process of elementary school students. This game can't only be played in groups with attractive visuals, but also encourages coordination between players during the activity and stimulates kinesthetic skills through various demonstrations.

Furthermore, board game in the context of health education, it has the advantage of instilling discipline in waiting one's turn to play. It also hones students' cognitive abilities through counting activities while throwing dice. It has attractive images that can attract children's attention. It is effective for reviewing previously taught lessons, fostering teamwork, and motivating students to continue learning while playing (Alifunisa et al., 2023).

## RESEARCH METHODE

The subjects in this study were 5<sup>th</sup> grade students of SDN Kedungdoro V Surabaya, whose address is at Jl. Surabayan IV No. 28, Kedungdoro Village, Tegalsari District, Surabaya City. The total number of respondents involved in this study was 52 students. This research used a descriptive approach, which aimed to describe the behavior or condition of research subjects based on data obtained without providing any particular treatment or manipulation.

The research was conducted through several stages, including preparation, implementation, and analysis of the results. The preparation stage included developing the instruments and obtaining research permits. In the implementation stage, the researcher collected data at the research location, involving all predetermined respondents. The main instrument used in this study is a questionnaire sheet which has been prepared and adapted to the research objectives. The questionnaire results were used as the primary data source to assess the students' knowledge about dental caries before and after using the Dento Board

Game. The responses obtained from students served as indicators of their understanding of dental caries. The average scores were calculated and converted into percentages, which were then categorized according to (Nursalam, 2020) as follows : good (75%–100%), sufficient (56%–74%), and poor (<56%).

This research has received approval form Health Research Ethics Commission of Surabaya Health Polytechnic No. EA/3635/KEPK-Poltekkes\_Sby/V/2025.

## RESULT AND DISCUSSION

**Table 1.**

Student Distribution by Gender and Age at SDN Kedunggoro V, Surabaya City, Year 2024

No	Category	Total	Percentage
<b>Gender</b>			
1	Male	27	51,93 %
	Female	25	48,07 %
<b>Age (Years)</b>			
2	12	8	15,39 %
	11	37	71,15 %
	10	7	13,46 %
<b>TOTAL</b>		52	100%

Table 1 shows that the characteristics of respondents according to age and gender, the male gender variable is greater with a

percentage of 51.93% compared to the female gender with a percentage of 48.07%.

**Table 2.**

Distribution of Students Knowledge about Dental Caries Before Using Dento Board Game at SDN Kedunggoro V, Surabaya City, Year 2024.

Statement	Respondents Answer			
	Correct		Wrong	
	$\Sigma$	%	$\Sigma$	%
<b>A. Understanding caries or cavities</b>				
1 What is known about caries or cavities	26	50	26	50
2 The loss of substances that cause tooth decay	19	36,53	33	63,46
<b>B. Causes of caries or cavities</b>				
3 Foods that cause caries or cavities	25	48.07	27	51,92
4 Causes of caries or cavities	29	55.76	23	44,23
5 Activities that cause caries or cavities	29	55.76	23	44,23
<b>C. The consequences of caries or cavities</b>				
6 Cavities left for a long time	31	59.61	21	40,38
7 Colour of cavities	24	46.61	28	53,84
8 Tooth decay disorder	35	67.30	17	32,69
<b>D. How to prevent caries or cavities</b>				
9 How to prevent tooth decay	33	63.46	19	36,53

Statement	Respondents Answer				
	Correct		Wrong		
	$\Sigma$	%	$\Sigma$	%	
10	The right time to brush your teeth	34	65.38	18	34,61
11	The correct way to brush your teeth	25	48.07	27	51,92
12	Good toothpaste content	24	46.15	28	53,86
13	Brushing the upper and lower jaw teeth	27	51.92	25	48,07
14	Brushing the surface of the teeth for chewing food	27	51.92	25	48,07
15	What to do when you have finished consuming sweet and sticky foods	26	50	26	50
16	Efforts to prevent tooth decay	27	51.92	25	48,07
17	It's time to check again	30	57.69	22	42,3
<b>E. Treatment for caries or cavities</b>					
18	What to do if your tooth hurts	25	48.07	27	51,92
19	What to do if the hole is still small and doesn't hurt yet	24	46.15	28	53,84
20	What to do if you have a cavity	20	38.46	32	61,53
<b>Total</b>		540	1.039	500	961
<b>Average</b>		51%		49%	
<b>Category</b>		<b>Low</b>			

Table 2 shows that the Grade 5<sup>th</sup> students of SDN Kedungdoro V, Surabaya City before using media Dento Board Game shows a

percentage of 51% so it is included in the low category.

**Table 3.**

Distribution of Students Knowledge about Dental Caries After Using Dento Board Game at SDN Kedungdoro V, Surabaya City, Year 2024.

No	Statement	Respondents Answers			
		Correct		Wrong	
		$\Sigma$	%	$\Sigma$	%
<b>A. Understanding caries or cavities</b>					
1	What is known about caries or cavities	45	86.53	7	13.46
2	The loss of substances that cause tooth decay	44	84.61	8	15.38
<b>B. Causes of caries or cavities</b>					
3	Foods that cause caries or cavities	45	86.53	7	13.46
4	Causes of caries or cavities	45	86.53	7	13.46
5	Activities that cause caries or cavities	42	80.76	10	19.23
<b>C. The consequences of caries or cavities</b>					
6	Cavities left for a long time	49	94.23	3	5.77
7	Colour of cavities	48	92.31	4	7.69
8	Tooth decay disorder	44	84.62	8	15.38
<b>D. How to prevent caries or cavities</b>					
9	How to prevent tooth decay	39	75	13	25
10	The right time to brush your teeth	32	61.54	20	38.46
11	The correct way to brush your teeth	26	50	26	50

No	Statement	Respondents Answers			
		Correct		Wrong	
		Σ	%	Σ	%
12	Good toothpaste content	27	51.92	25	48.08
13	Brushing the upper and lower jaw teeth	27	51.92	25	48.08
14	Brushing the surface of the teeth for chewing food	33	63.46	19	36.54
15	What to do when you have finished consuming sweet and sticky foods	38	73.08	14	26.92
16	Efforts to prevent tooth decay	26	50	26	50
17	It's time to check again	30	57.69	27	42.31
<b>E. Treatment for caries or cavities</b>					
18	What to do if your tooth hurts	36	69.23	16	30.77
19	What to do if the hole is still small and doesn't hurt yet	34	65.36	18	34.64
20	What to do if you have a cavity	28	53.85	24	46.15
<b>Total</b>		738	1.419	307	581
<b>Average</b>		74%		26%	
<b>Category</b>		<b>Sufficient</b>			

Table 3 Shows that the knowledge of 5<sup>th</sup> grade students of SDN Kedungdoro V, Surabaya City regarding caries after using

media Dento Board Game shows a percentage of 74% so it is included in the sufficient category.

**Table 4.**

Recapitulation of Knowledge Level Results Before and After Using Dento Board Game Media for Students at SDN Kedungdoro V, Surabaya City, Year 2024.

No	Statement	Before		After	
		Correct %	Wrong %	Correct %	Wrong %
1	Knowledge about the meaning of caries or cavities	57	43	86	14
2	Knowledge about the causes of caries or cavities	47	53	85	15
3	Knowledge about the consequences of dental caries or cavities	42	58	80	20
4	Knowledge about how to prevent caries or cavities	46	54	57	43
5	Knowledge about treatment in case of caries or cavities	56	44	63	37
<b>Total</b>		248	252	371	129
<b>Average</b>		51	49	74	26
<b>Category</b>		<b>Low</b>		<b>Sufficient</b>	

Table 4 describes an increase in the knowledge of fifth-grade students at SDN Kedungdoro V, Surabaya, before and after the use of the Dento Board Game. The percentage of correct answers regarding the definition of dental caries or cavities increased from 57% to 86%; knowledge about the causes of caries or cavities rose from 47% to 85%; knowledge about the effects of caries or cavities improved from 42% to 80%; knowledge about how to

prevent caries or cavities increased from 46% to 57%; knowledge about treatment if caries or cavities occur from 56% to 63%. The average calculation obtained from the data analysis indicates a percentage of 74%, which reflects a considerable improvement in students' knowledge. This represents a 23% increase from the pre-test to the post-test results, demonstrating an advancement in the knowledge of fifth-grade students at

SDN Kedungdoro V, Surabaya towards dental caries from low to sufficient.

### Discussion

The research findings prior to the counseling session using the Dento Board Game indicated that the students' knowledge of dental caries was categorized as sufficient. This condition occurs due to the limited information received by students and the lack of counseling from health professionals. The central role of knowledge is to shape actions that support or hinder dental and oral health. This study's findings are consistent with the results of a study by (Prasatiya, R. A., NP, I. K. A., & Edi, 2022) (Eni Purwati et al., 2023), which showed that students' understanding of dental caries was categorized as sufficient due to an imbalance. The results obtained after conducting counseling using media Dento Board Game in the good category. This means that students already have good knowledge regarding the definition of caries after the counseling session. This is in line with (Kesehatan et al., 2024) The knowledge of students at SDN 39 Mattirowalie is categorized as good.

Knowledge of the causes of caries or cavities is categorized as insufficient. This is due to students' lack of knowledge about the causes of caries. Applying students' knowledge of the factors causing caries to daily activities can be an important effort to maintain healthy teeth and mouths. These results are consistent with the opinion who stated that the high prevalence of caries is due to children not practicing proper dental and oral care in terms of dietary intake (Azzah et al., 2023). This knowledge is categorized as good. Students have gained knowledge from the counseling provided. If this good knowledge is consistently implemented in their daily lives, students can better care for their dental and oral health. In line with (Dwi Permatasari et al., 2023) Tooth decay often occurs because children have not yet

applied knowledge about dental and oral health in their daily activities.

Knowledge about the effects of caries or cavities is considered insufficient, possibly due to limited information from teachers and parents, particularly about the effects of dental caries. Furthermore, students' lack of understanding is likely related to the lack of education from relevant parties. This research aligns with research conducted and important counseling in maintaining dental and oral health in elementary school-aged children (Lailatus Sa'adah, 2023). Knowledge of the impacts of caries or cavities was categorized as good. The results of the completed questionnaire indicated that most students had developed an understanding of the consequences of caries or cavities. This finding is consistent with (Rachmawati et al., 2023) finding that students' knowledge at SDN Sukowinangun 1 Magetan was categorized as good.

Knowledge regarding steps to prevent cavities is considered inadequate. This is likely due to students' lack of education from medical professionals, and the information they receive is limited. Therefore, health workers should intensify education to optimize students' knowledge about caries prevention. This is in line with (Larasati et al., 2022). Tooth brushing routines need to be intensified, because at that time the amount of saliva and oral activity decreases, which makes it easier for food residue to accumulate on the teeth. Knowledge about treatment for caries or cavities was categorized as adequate. The results showed that the majority of students did not fully understand the prevention and treatment of dental caries, even though they were familiar with the related terms. This finding aligns with the opinion of (Rachmawati et al., 2023). who asserted that students' limited understanding of caries treatment can lead to serious complications, such as swelling and early tooth extraction.

Knowledge about caries or cavity treatment is categorized as insufficient.

Students' lack of understanding of the importance of treatment for dental caries is a primary cause. This has the potential to increase the incidence of dental caries. In line with (Meisy Yuliana Putri et al., 2024) students' limited understanding of the meaning of dental care and fillings may contribute to students' low awareness of filling cavities. The average shows the percentage that falls into the sufficient category (Tahun & Anak, 2024). This means that counseling using media Dento Board Game had a positive impact on increasing students' knowledge about caries or cavities. Although the results showed a significant increase in knowledge about caries and its causes, there is still room for improvement in caries prevention and treatment methods. Therefore, game-based counseling can enhance students' understanding of relevant material (Worotitjan et al., 2013). Teaching students about dental and oral health is an important step in fostering a passion for learning, reducing fear, stimulating curiosity, and developing observational skills (Pay et al., 2023). This activity can be implemented, for example, in the form of counseling (Heny Noor Wijayanti, 2023).

## CONCLUSION

Based on the findings and result of the study, especially before applying the Dento Board Game, the the level knowledge of fifth-grade students at SDN Kedunggoro V, Surabaya was categorized as insufficient. However, after the implementation of learning activities using the Dento Board Game, students demonstrated a significant improvement in their understanding, reaching the "sufficient" category. These findings suggest that interactive learning media such as the Dento Board Game can serve as an effective educational tool for enhancing students' knowledge of dental caries and promoting better oral health awareness.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this manuscript.

## REFERENCES

- (SKI), S. K. I. (2023). Badan Kebijakan Pembangunan Kesehatan. *Kota Kediri Dalam Angka*, 1–68.
- Alifunisa, A. H., Dwi Kurniawati, 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*, 11–15.  
<https://doi.org/10.23917/jpmmmedika.v3i1.1124>
- Amalia, R. D., Rahutami, S., & Murni, S. N. (2024). Analisis faktor – faktor yang berhubungan dengan kejadian karies gigi (indeks dmf-t). *Jurnal Kesehatan Tambusai*, 5, 3357–3368.
- Azzah, S., Kusuma Astuti, I. N., & Hadi Poltekkes Kemenkes Surabaya, S. (2023). PENGETAHUAN TENTANG KARIES GIGI MOLAR PERTAMA PERMANEN SISWA SEKOLAH DASAR KELAS V. *Jurnal Ilmiah Keperawatan Gigi (JIKG)*, 4.
- Dida, A. (2018). Klasifikasi Penyebab Karies Gigi. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699.
- Dwi Permatasari, V., Prasetyowati, S., Marjianto, A., Kesehatan Gigi, J., & Kesehatan Kemenkes Surabaya, P. (2023). GAMBARAN PENGETAHUAN TENTANG KARIES PADA SISWA SEKOLAH DASAR KELAS IV. *Jurnal Ilmiah Keperawatan Gigi (JIKG)*, 4.
- Eni Purwati, D., Hidayati, S., & Kesehatan Gigi Poltekkes Kemenkes Yogyakarta, J. (2023). Efektifitas Penggunaan Media Stiker Puzzle Terhadap Pengetahuan Menyikat Gigi Anak Pada Usia 8-10 Tahun. *Jurnal Ilmiah Keperawatan Gigi (JIKG)*,

- 4(3), 190–197.
- Fuadah, N. T., Helena, D. F., & Tazkiyah, I. (2023). Dampak Mengonsumsi Makanan Kariogenik dan Perilaku Menggosok Gigi terhadap Kesehatan Gigi Anak Usia Sekolah Dasar. *Jurnal Penelitian Perawat Profesional*, 5(2), 771–782. <https://doi.org/10.37287/jppp.v5i2.1586>
- Heny Noor Wijayanti. (2023). Edukasi Kesehatan Gigi dan Mulut dalam Upaya Meningkatkan Kesehatan Gigi pada Anak Sekolah Dasar. *Room of Civil Society Development*, 2(2), 154–160. <https://doi.org/10.59110/rcsd.v2i2.201>
- Hidayati, S., Kunafah, S., & Mahirawatie, I. (2021). Pengetahuan Tentang Karies Gigi Pada Siswa Kelas V Sdn Pakal 1 Surabaya Tahun 2020. *Indonesian Journal of Health and Medical*, 1(3), 2774–5244.
- Kesehatan, J., Jkgm, M., Novia, I., Putri, S., Kintani, A., Nabilasari, I., & Henny, N. (2024). Penerapan Game Edukasi Ular Tangga Berbasis Web Terhadap Peningkatan Pengetahuan Kesehatan Gigi Dan Mulut Anak Application of Web-Based Snakes and Ladders Educational Games To Increase Children ' S Dental and Oral Health Knowledge. 6(1), 105–110.
- Lailatus Sa'adah, N. (2023). Hubungan Cara Sikat Gigi Dengan Kejadian Karies Gigi Pada Anak Sekolah Di SDN Sumberagung 02 Kecamatan Plumpang Kabupaten Tuban. *Jurnal Multidisiplin Indonesia*, 2(9), 2701–2708. <https://doi.org/10.58344/jmi.v2i9.536>
- Larasati, R., Wahyuni, D. F., Prasetyowati, S., & Hadi, S. (2022). Systematic Literature Review: Pengetahuan Dan Perilaku Menggosok Gigi Pada Anak Usia Sekolah Dasar. *Jurnal Kesehatan Gigi Dan Mulut (JKGM)*, 4(1), 45–52. <https://doi.org/10.36086/jkgm.v4i1.823>
- Mahendra, D., Jaya, I. M. M., & Lumban, A. M. R. (2019). Buku Ajar Promosi Kesehatan. *Program Studi Diploma Tiga Keperawatan Fakultas Vokasi UKI*, 1–107.
- Meisy Yuliana Putri, Larasati, R., Prasetyowati, S., & Ansari, A. (2024). The Effectiveness of Puppets as an Educational Tool to Enhance Dental Health Knowledge Among Elementary School Students in Surabaya, Indonesia. *International Journal of Advanced Health Science and Technology*, 4(5), 305–311. <https://doi.org/10.35882/ijahst.v4i5.412>
- Nursalam. (2020). 75 Konsep dan penerapan metodologi.pdf. In *Konsep dan Penerapan Metodologi Penelitian Ilmu Keperawatan*.
- Pay, M. N., Obi, A. L., Nubatonis, M. O., Pinat, L. M. A., & Eky, Y. E. (2023). the Effectiveness of Counseling Using Puzzle and Snake and Ladder Game Media on Dental Caries Knowledge in Elementary School Students. *JDHT Journal of Dental Hygiene and Therapy*, 4(2), 140–145. <https://doi.org/10.36082/jdht.v4i2.1311>
- Prasatiya, R. A., NP, I. K. A., & Edi, I. S. (2022). Hubungan Pengetahuan Siswa Tentang Karies Dengan Prevalensi Karies Gigi Molar Pertama Permanen (Pada Siswa Kelas Iv Sdn Pasongsongan Iv Kecamatan Pasongsongan Sumenep). *Jurnal Ilmiah Keperawatan Gigi (JIKG)*, 3(2), 220–232.
- Rachmawati, F. D., Prasetyowati, S., Chairanna, I., Poltekkes, M., & Surabaya, K. (2023). PENGETAHUAN TENTANG KARIES PADA SISWA SEKOLAH DASAR KELAS IV DAN V. *Jurnal Ilmiah Keperawatan Gigi (JIKG)*, 4.
- Tahun, N., & Anak, K. G. (2024). *GEMAKES: Jurnal Pengabdian Kepada Masyarakat EDUKASI MEDIA PROMOSI KESEHATAN*

*GIGI PADA GURU SD SEBAGAI MEDIA EDUCATION ON DENTAL HEALTH PROMOTION FOR ELEMENTARY SCHOOL TEACHERS AS AN EFFORT TO IMPROVE KNOWLEDGE IN PREVENTION OF* *Pendahuluan Masalah khusus.* 4, 383–386. <https://doi.org/10.36082/gemakes.v4i>

3.1905

Worotitjan, I., Mintjelungan, C. N., & Gunawan, P. (2013). Pengalaman Karies Gigi Serta Pola Makan Dan Minum Pada Anak Sekolah Dasar Di Desa Kiawa Kecamatan Kawangkoan Utara. *E-GIGI*, 1(1), 59–68. <https://doi.org/10.35790/eg.1.1.2013.1931>