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Strengthening Interactive Dental Health Education for Early Childhood in the Era of Globalization

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ABSTRACT

Dental health education is a crucial preventive measure in shaping healthy lifestyle behaviors from an early age. The success of education depends not only on the content of the material but also on the effectiveness of the media and methods used to convey messages in an interactive and easily understandable way to children. This study aims to determine the changes in the index before and after education on how to brush teeth at Global Mandiri Kindergarten. This was a pre-experimental study with a one-group pretest–posttest design involving a total sample of 57 kindergarten B students. The intervention consisted of education on the purpose of brushing teeth, selecting the appropriate toothbrush, brushing techniques (roll technique), brushing duration, and the use of fluoride toothpaste. The debris index was examined before and after the interactive education using the Playstore GigiKuHartaKu program. The examination before the education showed a debris index category ranging from moderate to poor. After the intervention, there was a change in the debris index category to good and moderate. There was a significant decrease in the debris index from 2.11 to 0.711, with a p-value of 0.001 ($p < 0.05$). The intervention, in the form of interactive and structured dental education, significantly improved dental hygiene in young children. These findings reinforce the importance of promotional education in the school environment as the foundation for long-term healthy living behaviors.

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INTRODUCTION

Amidst globalization and changes in people's lifestyles, children's dental and oral health has become an important issue that needs serious attention. The latest report from the Indonesian Ministry of Health (*Kemenkes RI*) shows that complaints related to teeth and mouth are now ranked highest among various public health problems, even surpassing hypertension. Approximately 50% of Indonesians have cavities, 37% have lost teeth, and 12.4% have gum disease. (Ministry of Health RI, 2023)

According to the 2023 Indonesian Health Survey (SKI), 93.8% of Indonesians brush their teeth daily, but only 2.3% do so correctly. The same survey also noted that 56.9% of the population over the age of 3 experience dental and oral problems (World Health Organization, 2025), with 88% of them suffering from caries, and only 6.2% brushing their teeth as recommended. These data show that dental hygiene practices are not fully accompanied by proper understanding. (Indonesian Ministry of Health, 2023)This condition is also reinforced by a World Health Organization report which states that three out of four school-age children in Southeast Asia suffer from untreated dental caries.

The high rate of caries is caused by various factors, ranging from diets high in sugar, the habit of consuming cariogenic foods, to a lack of knowledge about how to brush teeth properly. Jusuf Kristianto et al. explain that dental hygiene behaviors and habits, including the frequency of brushing teeth and the types of food consumed, have a significant influence on the occurrence of caries. (J. K. Kristianto et al., 2023)

In addition, Jusuf Kristianto et al. (2023) also emphasize the importance of establishing the habit of brushing teeth properly as a primary preventive measure. Children in orphanages are said to be a group that is more vulnerable to dental problems due to limited access and supervision from adults, so an educational approach that is interesting, easy to understand, and utilizes technology is needed. (J. Kristianto et al., 2023) Furthermore, socioeconomic factors also influence dental and oral health. Notohartojo (2020) revealed that people with low economic status tend to have lower awareness and knowledge about the importance of maintaining dental health compared to those with higher economic status. (Notohartojo, 2020)

Data from the Ministry of Health BKPK (2023) even shows that of the 56.9% of people who experience dental problems, only 11.2% seek treatment from medical personnel, while the other 24.8% choose to treat themselves with over-the-counter painkillers.(Ministry of Health of the Republic of Indonesia, 2023)This phenomenon indicates that many people still lack awareness about the importance of regular dental check-ups. Therefore, dental health education and outreach activities are very important, such as those carried out through Community Service (PkM) activities at the Yos Sudarso Cilandak Orphanage, which combines dental check-ups and health education for foster children. This activity is in line with the spirit of the Indonesia Free of Caries 2030 program initiated by the Indonesian Ministry of Health. (J. Kristianto & Noviani, n.d.)

One form of innovation is the use of the *Gigiku Hartaku* application, an interactive digital educational medium that combines visual demonstrations, educational games, and guides on how to brush teeth properly. Innovations such as this prove that dental health education can be packaged in a fun way, especially for children. Several lecturers from the Jakarta I Ministry of Health Polytechnic also play an active role in community service activities with the aim of increasing children's knowledge, awareness, and ability to maintain dental and oral hygiene. (J. Kristianto & Noviani, n.d.)The success of health education does not only depend on how the educator speaks, but also on a deep understanding of the material and the ability to convey messages that can inspire behavioral change. (J. Kristianto et al., 2023)

The issue of toothbrushing behavior among school-aged children remains a challenge. Based on national data, only 2.3% of Indonesian children brush their teeth properly, with the lowest rate among 10-14 year olds at 1.7%. (Indonesian Ministry of Health, 2023)Children in this age range are in a complex stage of cognitive and emotional development, where they begin to question the reasons behind every habit they are taught. Therefore, an educational approach is not enough to simply instill habits; it must be accompanied by logical and emotional understanding appropriate to their stage of development. (Shirahmadi et al., 2024)

In an effort to improve the effectiveness of dental health education, various studies have shown that the selection of appropriate media and methods is very influential. Khafid et al. reported that the use of posters, both directly and through digital platforms such as *WhatsApp*, has been proven to increase children's knowledge about dental health while lowering their *Oral Hygiene Index – Simplified (OHI-S)* scores. (Khafid et al., n.d.).

Meanwhile, Grace Sianipar found that educational videos are one of the most effective tools for improving elementary school children's understanding of the importance of brushing their teeth, especially if the videos are packaged with attractive visuals. (Sianipar, 2024)Similar findings were reported by Novita Sari et al., who showed that the use of tooth puppets and

interactive presentations were able to attract children's attention and significantly improve their knowledge retention. **(**Sari et al., 2025)

A similar learning model was also implemented by the Indonesian Pediatric Dentists Association (IDGAI) together with the Faculty of Dentistry, University of Indonesia (FKG UI) in the **"***Senyum Sehat Anak Indonesia***"** (Healthy Smiles for Indonesian Children) activity in August 2025. More than 180 children from orphanages in East Jakarta participated in interactive counseling activities, group toothbrushing practice, and individual dental examinations. This program emphasized the importance of a preventive approach over a curative one, and integrated dental education into school activities such as early childhood education, kindergarten, and elementary school. **(**Jakarta Social Service Agency, 2025)

One example of a similar activity is dental health education at Global Mandiri Regency Kindergarten, which is part of the School Dental Health Program (UKGS). Based on initial observations, most students showed suboptimal dental hygiene. Therefore, educational activities were conducted using lectures and demonstrations to improve children's knowledge and skills in brushing their teeth properly ((J. Kristianto & Noviani, n.d.). Dewanto et al. state that a participatory approach is more effective in health promotion than passive methods ((Dewanto et al., 2020).

The effectiveness of this activity was then measured using the OHI-S (Oral Hygiene Index – Simplified) dental hygiene index, particularly the Debris Index (DI) component, to observe changes in dental hygiene before and after the education session. The use of OHI-S is considered valid and easy to apply in the field to objectively assess children's dental hygiene behavior. Through this activity, children not only gained new knowledge but also experienced real changes in their dental and oral hygiene behaviors. Thus, the interactive education at Global Mandiri Regency Kindergarten is a concrete example of how targeted and enjoyable education can contribute to the effort to achieve Indonesia Free of Caries 2030. (J. Kristianto et al., 2023)

This study aims to determine changes in the index before and after the toothbrushing education session at TK Global Mandiri. The results of this research are expected to provide benefits both practically and academically. Practically, this research can be a reference for educators and health workers in designing interactive and effective dental health education programs for early childhood. For educational institutions, these findings can support the development of an Independent Curriculum that integrates health education in daily learning. Academically, this research contributes to the development of community dental health science and becomes the basis for further research on digital educational media in the promotion of children's dental health.

METHOD

The research design was pre-experimental with a one-group pretest-posttest design to measure changes in the Debris Index (DI) before and after the educational intervention. The research location was at Global Mandiri Kindergarten, East Jakarta. The location was chosen because initial observations showed that children's dental hygiene was still low and the school was actively developing the UKGS program. The research was conducted in three sessions: February 13, 20, and 27, 2025. The population in the study was all 57 kindergarten B students using the total sampling method.

Examination Tools: Headlamp, mouth mirror, probe, tweezers, Nierbecken, mask, sterile gloves, and writing instruments. Educational Tools: Tooth model, toothbrush, uniform, laptop, LCD projector, and GigiKuHartaKu playstore program. Supporting Materials: Children's toothpaste, 70% alcohol, clean water, cotton, and tissues.

The research was conducted in four stages: preparation, pretest, educational intervention, and posttest. The preparation stage began with coordination with the school, submitting permission requests, and obtaining informed consent from parents. The pretest stage involved an initial examination of children's dental hygiene using the Debris Index (DI) before the intervention. The educational intervention stage was carried out by providing interactive counseling on how to brush teeth properly through lectures, demonstrations, tooth models, videos, and interaction with the GigiKuHartaKu Playstore program. The final stage was a re-examination of the Debris Index 2 weeks after the GigiKuHartaKu Playstore program intervention.

Data on the Debris Index before and after the intervention, which involved counseling using the GigiKuHartaKu Playstore program, were then compared using descriptive and inferential statistical tests to see changes in the dental hygiene levels of children at Global Mandiri Regency Kindergarten.

RESEARCH RESULTS

This study was conducted on February 10, 20, and 28, 2025, at Global Mandiri Regency Kindergarten, East Jakarta. The school has 73 students, led by a principal and supported by 7 teachers, with 7 classrooms and other supporting facilities. From the total population, 57 kindergarten B students were selected as research subjects using total sampling to ensure maximum representation.

The distribution of respondents based on gender shows a balanced composition. Of the 57 students, there were 29 male students (51%) and 28 female students (49%), so that gender representation can be considered even (Table 1).

Table 1. Distribution of respondent characteristics based on gender

Gender	n	%
Male	29	51
Female	28	49
Total	57	100

Source: Primary data processed by researchers (2025)

Before the intervention, the Debris Index (DI) examination showed that most students had poor dental hygiene. No students were in the good category, 15 students (26%) were in the moderate category, and 42 students (74%) were in the poor category (Table 2).

Table 2. Debris Index examination results before dental health education

Category	n	%
Good	0	0
Moderate	15	26
Poor	42	74
Total	57	100

Source: Primary data processed by researchers (2025)

After interactive counseling on proper tooth brushing techniques, there was a significant improvement in children's dental hygiene. Of the 57 students, 12 children (21%) achieved a good rating, 45 children (79%) achieved an average rating, and none of the students achieved a poor rating (Table 3).

Table 3. Results of debris index examination after dental health education

Category	n	%
Good	12	21
Moderate	45	79
Poor	0	0
Total	57	100

Source: Primary data processed by researchers (2025)

The comparison between the conditions before and after the counseling shows very positive changes. The good category increased from 0 to 12 students, the moderate category rose from 15 to 45 students, and the poor category was reduced from 42 to 0 students. This proves that the counseling method applied—a combination of lectures, demonstrations, and the use of visual aids—is effective in improving understanding and practice of proper tooth brushing in early childhood (Table 4).

Table 4. Debris Index Results Before and After the GigiKuHartaKu Playstore Program Intervention

Index	Before health education		After health education	
Debris	n	%	n	%
Good	0	0	12	21
Moderate	15	26	45	79
Poor	42	74	0	0
Total	57	100	57	100

Source: Primary data processed by researchers (2025)

The average Debris Index value before counseling was 2.11 ± 0.32, while after counseling it decreased to 0.711 ± 0.15. The results of the Wilcoxon Signed Rank Test showed a p-value of 0.0001 ($p < 0.05$), which means that there was a statistically significant difference between the conditions before and after the counseling (Table 5). Thus, the null hypothesis (H_0) was rejected and the alternative hypothesis (H_1) was accepted.

Table 5. Comparison of the average debris index before dental health education and the average debris index after dental health education with the GigiKuHartaKu Playstore Program.

Index	n	Mean ± SD	P value
Debris before education	57	2.11 ± 0.32	0.0001
Debris after counseling	57	0.711 ± 0.15	

*Significant ($p<0.05$)

Source: Primary data processed by researchers (2025)

DISCUSSION

This study proves that dental health education using the GigiKuHartaKu Playstore Program, conducted systematically and interactively, has a significant impact on the dental hygiene of young children. Using a pre-experimental One Group Pretest-Posttest approach, the researchers successfully demonstrated that changes in toothbrushing behavior can be achieved through targeted education supported by methods appropriate to the characteristics of children.

The results showed that before the intervention, the average Debris Index score of students at Global Mandiri Regency Kindergarten was 2.11, which was classified as poor. After the counseling, the score decreased dramatically to 0.711, which is classified as moderate. Not only that, 12 students achieved a good score, and no students were in the poor category. This change shows that the educational intervention of the GigiKuHartaKu playstore program was able to influence children's habits and skills in maintaining dental hygiene.

Statistical analysis using the Wilcoxon Signed Rank Test produced a p-value of 0.0001, well below the significance threshold of $p < 0.05$. This indicates that the changes that occurred were not coincidental but were the actual result of the intervention provided. Thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. The success of this intervention is inseparable from the educational approach of the GigiKuHartaKu playstore program that was implemented.

The researchers not only conveyed information verbally through the interactive GigiKuHartaKu Playstore Program, but also explained the purpose of brushing teeth, introduced the selection of the right toothbrush, taught the roll brushing technique, emphasized brushing for 2 minutes twice a day, and encouraged the use of fluoride toothpaste. This approach addresses both the cognitive and affective aspects of children, so they not only know what actions to take but also understand the reasons behind those actions and are motivated to perform them routinely.

This study is supported by research by Pudentiana et al. (2021), which shows that increased knowledge about oral health in elementary school children can lower their OHI-S scores. Although specific scores were not mentioned, the results of this study are in line with the findings you mentioned. (Pudentiana Rr RE et al., 2021)Ilyas and Putri emphasized the effectiveness of the demonstration method in improving children's toothbrushing skills. Research conducted at Padang Loang Elementary School showed a decrease in plaque index from 3.55 to 1.28. (Ilyas & Putri, 2012)Nurhidayat's research also proved that the use of PowerPoint media is more effective than flipcharts. (Nurhidayat, 2012)Notoatmodjo recommends the lecture method for large groups. All these findings support that a combination of lectures, demonstrations, and educational media provides optimal results in children's dental health education. (Notoatmodjo, 2018)

In addition, the use of educational media has been proven to strengthen students' understanding and awareness of dental and oral health. The success of this study can be analyzed from various aspects, such as the active involvement of students in toothbrushing demonstrations that encourage direct practice and strengthen knowledge retention. The lecture method with the interactive GigiKuHartaKu playstore program and demonstrations were tailored to the characteristics of kindergarten children, making the material easier to understand, while the selection of attractive and age-appropriate educational media, including tooth models, videos, visual projections, and the GigiKuHartaKu playstore program, increased

children's attention and motivation. In addition, consistent instruction and supervision by the outreach team ensures that toothbrushing techniques are performed correctly. Support from the school environment, including the principal and teachers who are responsive to the UKGS program, also plays an important role in ensuring the smooth implementation of the outreach program. The significant decrease in the Debris Index score indicates that children not only receive information but are also able to internalize and practice it in their daily lives.

CONCLUSION

The use of interactive media through the GigiKuHartaKu Playstore program at Global Mandiri Regency Kindergarten proved highly effective in improving children's dental hygiene, reflected in positive behavioral changes and statistically significant clinical outcomes. This study emphasizes that early interactive dental health education fosters correct toothbrushing habits and builds a foundation for lifelong oral hygiene awareness. To sustain these positive outcomes, collaboration between dental health professionals and schools through School Dental Health Programs (UKGS) should be strengthened. Future research should explore the long-term effectiveness of interactive education tools across diverse school settings and age groups to enhance early childhood oral health promotion strategies.

REFERENCES

Dewanto, I., Koontongkaew, S., & Widyanti, N. (2020). Characteristics of dental services in rural, suburban, and urban areas upon the implementation of Indonesia National Health Insurance. *Frontiers in Public Health, 8.* https://doi.org/10.3389/fpubh.2020.00138

Dinas Sosial DKI Jakarta. (2025). *IDGAI dan FKG UI gelar pengabdian masyarakat "Senyum Sehat Anak Indonesia" di PSAA Putra Utama 1.*

Ilyas, M., & Putri, I. N. (2012). Efek penyuluhan metode demonstrasi menyikat gigi terhadap penurunan indeks plak gigi pada murid sekolah dasar (Effect of demonstration method counseling on brushing teeth to the decreasing of plaque value of elementary school students). *Dentofasial, 2,* 91–95.

Kementerian Kesehatan RI. (2023). *Survei Kesehatan Indonesia (SKI) 2023.* https://www.badankebijakan.kemkes.go.id/hasil-ski-2023/

Khafid, M., Salsabila, N., Kesehatan, D. I., Masyarakat, G., Pencegahan, D., Gigi, K., Ilmu, I., Bhakti, K., Kediri, W., Email, I., & Korespondensi, P. (n.d.). Efektivitas poster bergerak pada WhatsApp dalam meningkatkan kesehatan gigi siswa SDN 1 Talangsaronggi Sumenep. *Sinnun Maxillofacial Journal, 6*(2).

Kristianto, J., & Noviani, N. (n.d.). Edukasi kesehatan gigi dengan program Play Store *Kesehatan Gigiku Hartaku* pada Panti Asuhan Yos Sudarso Cilandak Jakarta Selatan. *Seminar Nasional "Penerapan Inovasi Hasil Pengabmas Sebagai Upaya Peningkatan Kesehatan Ibu dan Anak."* https://doi.org/10.47539/pengabmas.v2i1.27

Kristianto, J. K., Noviani, N., & Lestari, S. Y. (2023). Penyuluhan kesehatan gigi pada murid TK Global Mandiri Regency dengan penyuluhan interkatif dan video menyikat gigi. *GEMAKES: Jurnal Pengabdian Kepada Masyarakat, 3*(1), 103–107. https://doi.org/10.36082/gemakes.v3i1.1072

Kristianto, J., Noviani H, N., Putri Dwiastuti, S. A., & Ratuela, J. (2023). The efficiency model of mentoring through ebook *Keep Your Teeth & Oral Healthy*, based on Android to improving the degree of dental and oral hygiene and knowledge in student of elementary

class V Jakarta, in 2022. *Jurnal Health Sains, 3*(10), 1555–1566. https://doi.org/10.46799/jhs.v3i10.632

Notoatmodjo, S. (2018). *Promosi kesehatan: Teori dan aplikasinya.* Rineka Cipta.

Notohartojo, I. T. (2020). *Percepatan pengendalian masalah status kesehatan gigi mulut melalui pendekatan individu dan kontekstual* (N. L. Pratiwi, Ed.). Lembaga Penerbit Badan Litbangkes.

Nurhidayat, O. (2012). Perbandingan media PowerPoint dengan flip chart dalam meningkatkan pengetahuan kesehatan gigi dan mulut. *Unnes Journal of Public Health.*

Pudentiana, R. R. R. E., Purnama, T., Emini, Tauchid, S. N., & Prihatiningsih, N. (2021). Knowledge of oral and dental health impacts the Oral Hygiene Index Simplified (OHI-S) of primary school children. *Indian Journal of Forensic Medicine & Toxicology, 15*(4), 2179–2183. https://doi.org/10.37506/ijfmt.v15i4.17030

Sari, N., Mu'alim, A., Mufida, N., Rahayu, L., & Irwayu, F. (2025). Pengaruh penyuluhan kesehatan cara menyikat gigi menggunakan media boneka bergigi terhadap peningkatan pengetahuan kesehatan gigi dan mulut pada siswa kelas III di SD Negeri 2 Kota Bakti Kabupaten Pidie. *Best Journal, 8*(1), 5.

Shirahmadi, S., Bashirian, S., Soltanian, A. R., Karimi-Shahanjarini, A., & Vahdatinia, F. (2024). Effectiveness of theory-based educational interventions of promoting oral health among elementary school students. *BMC Public Health, 24*(1). https://doi.org/10.1186/s12889-023-17528-0

Sianipar, G. M. E. (2024). Efektivitas penggunaan media penyuluhan terhadap peningkatan pengetahuan kesehatan gigi dan mulut pada anak SD. *Medika Kartika, 1.*

World Health Organization. (2025). *Oral health.* https://www.who.int/health-topics/oral-health#tab=tab_1