



Bingo Game in Improving Dental Health Knowledge in Elementary School

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ABSTRACT

Background: Effective education outreach is influenced by the media and methods used. Educating elementary school students requires methods that can capture their attention, such as using gaming media. With the advancement of technology, there are many interactive games that can be developed for use as educational tools. One interactive gaming medium that can be used for education outreach in this context is bingo. Modifying bingo into an educational medium can cultivate teamwork among students, enhance student engagement in learning, and create a more vibrant learning atmosphere. Objective: To analyze the level of dental health knowledge of 5th grade students at SDN Beji 2 Depok before and after education using the bingo game. Method: This research employs a quasi-experimental method with a one-group pretest-posttest design. It was conducted at SDN Beji 2 Depok, utilizing total sampling, involving 47 students. The independent variable is the bingo game, and the dependent variable is the level of dental health knowledge among students. The instruments used include a questionnaire and the bingo game media. Data analysis is conducted using the Wilcoxon signed-rank test. Results: This study shows the average value of dental health knowledge before playing with bingo games is 65.53 and after playing with bingo games is 93.62, with Wilcoxon test results of $p < 0.001$. Conclusion: Bingo game is effective in improving dental health knowledge among elementary school students.

INTRODUCTION

Oral health is an ideal condition of the soft and hard tissues of the teeth and oral cavity. This condition can make each individual live a productive social and economic life free from problems with dental function, appearance, and discomfort due to dental disorders (Hidayah & Praptiwi, 2021). Oral health needs to be maintained because it can have a negative impact on daily life, such as a decrease in general health (Kemenkes RI, 2019).

Dental and oral health issues in Indonesia reached 57.6% in 2018. Among the elementary school age group (10-14 years), the proportion of dental and oral health problems was 55.6%, with a caries incidence rate of 73.4%. One of the regions in Indonesia experiencing significant dental and oral health issues is West Java Province, with a proportion of 58.0%. In the 10-14 age group in this province, the incidence rate of dental and oral health problems reached 53.79% (Risksedas, 2018). Besides occurring in Indonesia, dental and oral health problems are also experienced in other countries. It was proven by research (Arangannal et al., 2016) that the prevalence of dental caries in Chennai, India, among schoolchildren aged 6-14 years was 68.8%, with the highest percentage of caries cases occurring in 10-year-old children (76%). Another study by (Nayani et al., 2018) indicated that 67% of children aged 5-14 years in Karachi, Pakistan, experienced dental caries. Therefore, the condition of dental and oral health in Indonesia and around the world must be given attention because if caries occur during childhood, it is highly likely to affect dental and oral health in adulthood (Krisyudhanti & Fankari, 2022).

Dental caries in schoolchildren can affect their quality of life. This is validated by a study (Apro et al., 2022) concluded that caries in children impacts their daily activities, thereby affecting their quality of life. Children with dental caries have a lower quality of life compared to those without. Another study (Hasibuan, 2023) found that the most affected daily activity due to dental caries is eating (35.8%). This indicates that these issues can disrupt routine daily activities and potentially impact the child's nutritional status (Susilawati et al., 2023).

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The occurrence of dental and oral health issues is partly due to attitude and behavior factors (Rahayu et al., 2014). Individuals with positive knowledge, attitudes, and behaviors towards dental and oral health tend to have a lower incidence of caries (Khulwani et al., 2021). Research (Darmayanti et al., 2022) has proven that behavior affects dental health, as good tooth-brushing habits can reduce the risk of dental caries. To avoid high levels of dental and oral health problems, it is necessary for individuals to be aware of and practice a healthy lifestyle, including enhancing understanding through dental health education (Aldilawati et al., 2022).

According to (Widorini et al., 2021), increasing knowledge can be achieved through dental health education or promotion. This is supported by a study by (Reca & Restuning, 2022) which found that providing information through dental health education can enhance students' knowledge, the more information they receive, the more their knowledge increases. Another study by (Supariani & Ratmini, 2016) showed that education can improve knowledge, as evidenced by the average knowledge level rising from 72.32 before receiving education to 89.85 after being given dental health education.

The success of education outreach can be influenced by the media and methods used. Media play a crucial role in supporting the learning process because they can make the learning experience more engaging and enjoyable, preventing the audience from becoming easily bored during the education sessions (Purwono et al., 2014). The methods of education outreach serve as pillars and supports to enhance the effectiveness of learning, thereby increasing interest and making it easier for the audience to understand the material (Prihatini, 2017).

A method of education outreach that can be used as an alternative to capture students' interest is using gaming media. Interactive gaming media is expected to create active learning activities, making the learning environment more enjoyable and sparking students' interest in learning (Maharinda & Subroto, 2017). Research by (Darmawan, 2023) has proven that gaming media can enhance students' knowledge, as evidenced by their knowledge scores increasing from an average of 34.2 before the outreach to 91.2 afterward.

Another interactive gaming medium that can be used is bingo. Bingo is a fun and easy game both individually and in groups (Sahnaputri & Kareviati, 2021). Bingo has advantages in training cooperation among students, respecting others' opinions, increasing student participation in learning, and creating a lively learning atmosphere, enabling educators to achieve learning objectives effectively (Oktaviani et al., 2019). Therefore, this game can be utilized to educate school-age children about dental health.

METHOD

The research design used in this study employs a quasi-experimental method with a one-group pretest-posttest design. The study was conducted on 5th grade students at SDN Beji 2 Depok. The sampling technique used total sampling, involving 47 students.

The instruments used consist of informed consent, questionnaires (pretest and posttest), educational sessions, and the bingo game media. The research was conducted over three weeks with two interventions. The pre-test and post-test were administered 15 days apart. According to the theory (Notoatmodjo, 2018) if the tests are administered too close together, respondents may still remember the questions from the pre-test, whereas if conducted too far apart, changes in the measured variables may have already occurred. The activities carried out are as follows:

1. The researcher introduced themselves and explained the activities to be carried out to the respondents.
2. Informed consent forms were distributed to the respondents before data collection.
3. On the first visit, the researcher distributed a questionnaire (pre-test) about dental health to measure knowledge before the education was provided. Then, the researcher conducted dental health education using bingo games played in groups for 50 minutes.
4. On the second visit, the researcher conducted education using bingo games played individually for 45 minutes.
5. On the third visit, the researcher gave a post-test questionnaire to the respondents to assess their knowledge after the education.

The data collected through the respondents' completion of questionnaires was then processed and analyzed. The first step in data analysis is conducting a normality test, followed by a Wilcoxon test.

RESULT

Table 1. Frequency distribution of respondent characteristics by age and gender

Characteristics	Frequency	Percent (%)
Age		
11	28	59.6%
12	19	40.4%
Total	47	100%
Gender		
Male	27	57.4%
Female	20	42.6%
Total	47	100%

Table 1 shows that the majority of respondents are 11 years old, totaling 28 students (57.4%), while 19 students (42.6%) are 12 years old. Based on gender, most of the students are male, with 27 students (57.4%), while the female students total 20 (42.6%).

Table 2. Frequency distribution of students' dental health knowledge levels before and after playing with bingo media

Knowledge Level	Before		After	
	F	%	F	%
Good	9	19.1	45	95.7
Moderate	31	66.0	1	2.15
Less	7	14.9	1	2.15
Total	47	100%	47	100%

Table 2 shows that before being educated using bingo media, the majority of students, 31 students (66.0%), had moderate knowledge of dental health, while at least 7 students (14.9%) have knowledge in the less category. After implementing education using bingo media, the majority of students demonstrated good knowledge of dental health, with 45 students (95.7%). Additionally, there was 1 student (2.15%) with moderate knowledge and 1 student (2.15%) have knowledge in the less category.

Table 3. Effectiveness test of students' dental health knowledge before and after education with bingo game

Knowledge	Mean	SD	p-value
Pre-test	65.53	11.943	0.001
Post-test	93.62	10.092	

* Wilcoxon

Table 3 shows that the effectiveness test results on students' dental health knowledge obtained an average pre-test score of 65.53, which increased to 93.62 in the post-test with a p-value of 0.001 ($p < 0.05$). These results indicate that the bingo game is effective in improving students' dental health knowledge.

DISCUSSION

The advancement of technology can be utilized to develop educational games-based learning media (Salsabila & Setyaningrum, 2019). Games are a suitable learning approach for school-age children as they can enhance students' activity and creativity (Bate'e et al., 2023). Making lessons engaging is one way to increase students' interest in learning, enabling them to focus and actively participate in learning activities (Masrohah et al., 2019). There are several types of gaming media, one of which is bingo games. Implementing bingo games can make students interested and enthusiastic about learning actively and understanding the learning materials (Dewi et al., 2019).

The results showed that before education with bingo games, the majority of 31 students (66.0%) had sufficient knowledge of dental health. This study is consistent with the research by (Parmasari et al., 2022) which showed that out of 52 respondents from fourth and 5th grade students in this study, 41 respondents (78.8%) had sufficient dental health knowledge. The low level of knowledge is due to the majority of students having a limited understanding of the function of teeth, the timing of regular dental check-ups, and how to clean food residues from teeth. Another possible cause could be age-related factors, as the respondents in this study are aged between 11 and 12 years and fall into the category of children. In line with the theory (Notoatmodjo, 2018), one of the factors that can influence knowledge is age, because the younger someone is, the less knowledge they have and the more difficult it is to digest received information. Supported by research (Samsul et al., 2021), which confirms the influence of age on students' dental health knowledge levels. Therefore, the role of parents and educational institutions in providing education to children regarding dental and oral health is of great importance (Meidina et al., 2023).

Efforts to enhance the knowledge of dental health among 5th grade students at SDN Beji 2 Depok involved researchers conducting an intervention through dental and oral health education using bingo games twice. Bingo is a game featuring a grid of numbers with questions on the reverse side. The use of bingo games in education aims to captivate students' attention, preventing boredom during the learning process, thereby ensuring an enjoyable learning experience and igniting students' interest (Maharinda & Subroto, 2017). In the first stage, the researcher implemented group-based bingo game education to promote cooperation among students. During this phase, students actively participated in the game and engaged in group discussions to strategize for victory. Subsequently, the second stage involved individual-based bingo game education, where students displayed enthusiasm in competing against each other to win, creating a vibrant classroom atmosphere that was effectively managed.

According to Table 2, which shows the level of students' knowledge after being educated through bingo games, nearly all 5th grade students at SDN Beji 2 Depok have good knowledge of dental health, totaling 45 students (95.7%). This study indicates that there is a difference in average scores before and after dental health education through bingo games, which effectively enhances knowledge of dental health. This is evident from the increase in the average score from 65.53 before education to 93.62 after education, resulting in a difference of 28.09.

Based on the Wilcoxon test results, a p-value of 0.001 ($p < 0.05$) was obtained, indicating that the bingo game is effective in improving students' dental health knowledge. This finding is consistent with the theory proposed by (Masrohah et al., 2019), which suggests that bingo games can stimulate student enthusiasm, boost their motivation, and create an enjoyable learning atmosphere. Therefore, bingo games can effectively capture students' attention and encourage active participation in the learning process. The research conducted by (Hutami et al., 2019) proves that games can indeed improve students' dental health knowledge, as evidenced by the data analysis results showing a p-value of 0.000 ($p < 0.05$). This is further supported by the study of (Oktaviani et al., 2019), which indicates that bingo games can influence student learning outcomes, as indicated by the t-test calculations. Hence, it can be concluded that bingo games are effective in enhancing knowledge because the use of game-based learning methods can heighten students' interest and concentration during the learning process.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that bingo games are effective in improving dental health knowledge of elementary school students.

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REFERENCES

- Aldilawati, S., Wijaya, M. F., & Hasanuddin, N. R. (2022). Upaya Peningkatkan Status Pengetahuan Kesehatan Gigi dan Mulut pada Masyarakat dengan Metode Penyuluhan FlipChart dan Video di Desa Lanna. *Idea Pengabdian Masyarakat*, 2(1), 36–40. <https://doi.org/10.53690/ipm.v2i01.82>
- Apro, V., Susi, & Sari, D. P. (2022). Dampak Karies Gigi Terhadap Kualitas Hidup Anak. *Andalas Dental Journal*, 77, 89–97. <https://doi.org/10.25077/adj.v8i2.204>
- Arangannal, P., Mahadev, S. K., & Jayaprakash, J. (2016). Prevalence of Dental Caries among School Children

- in Chennai, Based on ICDAS II. *J Clin Diagn Res*, 10(4), 9–12. <https://doi.org/10.7860/JCDR/2016/14731.7523>
- Bate'e, A. K., Laoli, J. de rana, Dohona, S., & Lase, I. W. (2023). Penerapan Metode Permainan Untuk Meningkatkan Minat Belajar Siswa Sekolah Dasar. *Prosiding Conference of Elementary Studies (CES) 2023*, 46–53. <https://journal.um-surabaya.ac.id/Pro/article/view/19713/6719>
- Darmawan, R. (2023). Pengaruh Media Spinning Wheel Game Terhadap Pengetahuan Tentang Kesehatan Gigi Siswa/I Madrasah Ibtidaiyah Negeri 1 Kota Bengkulu Tahun 2020. *Jurnal Prosehatku*, 2(1), 11–17. <https://doi.org/10.33088/jurnalprosehatku.v2i1.356>
- Darmayanti, R., Irawan, E., Iklima, N., Anggriani, P., & Handayani, N. (2022). Hubungan Perilaku Menggosok Gigi dengan Kejadian Karies Gigi Pada Anak Kelas V SDN 045 Pasir Kaliki. *Jurnal Keperawatan BSI*, 10(2), 284–290. <https://ejurnal.ars.ac.id/index.php/keperawatan/article/view/896>
- Dewi, N. F., Victoria, D. C., & Anita, I. (2019). Penerapan Metode Permainan Bingo untuk Meningkatkan Aktivitas Belajar dalam Pembelajaran Kosakata Benda Bahasa Inggris Kelas 4 Sekolah Dasar. *Educare*, 17(1), 28–33.
- Hasibuan, M. R. (2023). *Hubungan Status Karies dengan Kualitas Hidup Anak Sekolah Dasar Usia 10-12 Tahun di Kecamatan Kuranji*. <http://scholar.unand.ac.id/id/eprint/209831>
- Hidayah, N., & Praptiwi, Y. H. (2021). Gambaran Tingkat Pengetahuan Kesehatan Gigi dan Mulut Pada Orang Tua Anak Usia Prasekolah. *Jurnal Kesehatan Gigi Dan Mulut (JKGM)*, 3(2), 11–17. <https://doi.org/10.36086/jkgm.v3i2.844>
- Hutami, A. R., Dewi, N. M., Setiawan, N. R., Putri, A. P., & Kaswindarti, S. (2019). Penerapan Permainan MOLEGI (Monopoli Puzzle Kesehatan Gigi) Sebagai Media Edukasi Kesehatan Gigi dan Mulut Siswa SD Negeri 1 Bumi. *Jurnal Pemberdayaan Masyarakat Universitas Al Azhar Indonesia*, 01(2). <https://jurnal.uai.ac.id/index.php/JPM/article/view/341/330>
- Kemenkes RI. (2019). *Infodatin: Kesehatan Gigi Nasional*. Pusdatin Kemenkes RI.
- Khulwani, Q. W., Nasia, A. A., Nugraheni, A., & Utami, A. (2021). *Hubungan Pengetahuan, Sikap, dan Perilaku Kesehatan Gigi dan Mulut Terhadap Status Karies Siswa SMP Negeri 1 Selogiri, Wonogiri*. 9(30), 41–44. <https://doi.org/10.35790/eg.9.1.2021.32570>
- Krisyudhanti, E., & Fankari, F. (2022). Kartu Gigi Beta Sehat Untuk Penentuan Prevalensi Karies dan Kebutuhan Perawatannya Pada Siswa Sekolah Dasar. *Dental Therapist Journal*, 4(2), 58–63. <https://doi.org/10.31965/dtj.v4i2.945>
- Maharinda, A., & Subroto, W. T. (2017). Pengembangan Media Spin Well Materi Alat Pembayaran di Kelas X Sekolah Menengah Atas. *Jurnal Pendidikan Ekonomi*, 5(3), 5–6. <https://core.ac.uk/reader/230753574>
- Masrohah, K., Wiarsih, C., & Irawan, D. (2019). Penerapan Metode Permainan Bingo Untuk Meningkatkan Minat dan Prestasi Belajar Siswa dalam Pembelajaran Tematik. *Jurnal Pendidikan Dan Pembelajaran Dasar*, 11(2), 13–22. <https://doi.org/10.18860/madrasah.v11i2.7113>
- Meidina, A. S., Hidayati, S., & Mahirawatie, I. C. (2023). Systematic Literature Review: Pengetahuan Pemeliharaan Kesehatan Gigi dan Mulut Pada Anak Sekolah Dasar. *Indonesian Journal of Health and Medical*, 3(2), 41–61. <https://ijohm.rcipublisher.org/index.php/ijohm/article/view/211>
- Nayani, A. A., Iqbal, R., Azam, S. I., Khan, F. R., & Khan, A. H. (2018). Association between environmental tobacco smoke and dental caries amongst 5-14 years old children in Karachi, Pakistan. *Journal of Pakistan Medical Association*, 68(2), 203–209.
- Notoatmodjo, S. (2018). *Metodologi Penelitian Kesehatan*. PT Rineka Cipta.
- Oktaviani, T., Dewi, E. R. S., & Kiswoyo. (2019). Penerapan Pembelajaran Aktif dengan Metode Permainan Bingo Untuk Meningkatkan Hasil Belajar Matematika. *Jurnal Mimbar Ilmu*, 24(1), 47–52. <https://doi.org/doi.org/10.23887/mi.v24i1.17409>
- Parmasari, W. D., Tjandra, L., Theodora, & Willianti, E. (2022). Hubungan Tingkat Pengetahuan Tentang Kesehatan Gigi dengan Kejadian Karies pada Siswa Sekolah Dasar Surabaya. *Sinnun Maxillofacial Journal*, 4(2), 61–66. <https://doi.org/10.33096/smj.v4i02.79>
- Prihatini, E. (2017). Pengaruh Metode Pembelajaran dan Minat Belajar Terhadap Hasil Belajar IPA. *Jurnal Formatif* 7, 7(2), 171–179. <https://doi.org/10.30998/formatif.v7i2.1831>
- Purwono, J., Yutmini, S., & Anitah, S. (2014). Penggunaan Media Audio-Visual Pada Mata Pelajaran Ilmu Pengetahuan Alam di SMP Negeri 1 Pacitan. *Jurnal Teknologi Pendidikan Dan Pembelajaran*, 2(2), 127.
- Rahayu, C., Widiati, S., & Widyanti, N. (2014). Hubungan antara Pengetahuan, Sikap, dan Perilaku terhadap Pemeliharaan Kebersihan Gigi dan Mulut dengan Status Kesehatan Periodontal Pra Lansia di Posbindu Kecamatan Indihiang Kota Tasikmalaya. *Majalah Kedokteran Gigi Indonesia*, 21(1), 27–32. <https://doi.org/10.22146/majkedgiind.8515>
- Reca, R., & Restuning, S. (2022). Pengaruh Edukasi Kesehatan Gigi Terhadap Pengetahuan Anak di SDN 12 Kota Banda Aceh. *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*, 14(1), 215–221. <https://doi.org/10.34011/juriskesbdg.v14i1.2060>

- Riskesdas. (2018). *Riskesdas 2018*.
- Sahnaputri, F., & Kareviati, E. (2021). Students' Responses Toward The Implementation of Bingo Game with Scientific Approach in Teaching Writing Descriptive Text. *Professional Journal of English Education*, 4(3), 392–396. <https://doi.org/10.22460/project.v4i3.p392-396>
- Salsabila, N. H., & Setyaningrum, W. (2019). Pengembangan Media Pembelajaran Matematika Berbasis Game: Statistics In Arctic. *Mandalika Mathematics and Educations Journal*, 1(1), 13–25. <https://doi.org/10.29303/jm.v1i1.1248>
- Samsul, A. R., Praptiwi, Y. H., Putri, M. H., & Sirait, T. (2021). Hubungan Tingkat Pengetahuan Kesehatan Gigi Terhadap Sikap Untuk Menjaga Kebersihan Gigi Pada Siswa di SMA Negeri 1 Kawali. *JKGM*, 3(2), 36–40. <https://doi.org/10.36086/jkgm.v3i2.843>
- Supariani, N. N. D., & Ratmini, N. K. (2016). Efektivitas Penyuluhan Untuk Meningkatkan Pengetahuan kesehatan Gigi dan Mulut Siswa Kelas V SDN 16 Kesiman Denpasar Timur. *Jurnal Kesehatan Gigi*, 4(1), 35–42.
- Susilawati, E., Praptiwi, Y. H., Chaerudin, D. R., & Mulyanti, S. (2023). Hubungan Kejadian Karies Gigi dengan Kualitas Hidup Anak. *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*, 15(2), 476–485. <https://doi.org/10.34011/juriskesbdg.v15i2.2408>
- Widorini, D. E., Surachmindari, & Triningsih, R. W. (2021). Pengaruh Edukasi Terhadap Tingkat Kecemasan Pada Ibu dalam Menghadapi Menopause di Kelurahan Oro-oro Dowo Kota Malang. *Jurnal Kesehatan Siliwangi*, 2(1), 251–257. <https://doi.org/10.32831/jik.v6i1.149>