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The Influence of Peer Education on Tooth-brushing Behavior in Islamic Environments

[1]Faradhillah Kartono, [2]Nilawati Uly, [3]Sudirman Sanuddin, [3]Ridwan A, [4]Aswan

[1,2,3]Universitas Mega Buana Palopo, Indonesia
[4]Universitas Islam Negeri Palopo, Indonesia

E-mail: farakartono@gmail.com

Abstract

Oral health is a vital component of a child's overall quality of life. The 2018 Indonesian Basic Health Research (Riskesdas) revealed that the prevalence of dental caries exceeded 88%. In Luwu Regency, caries rates among schoolchildren remain high. This study aims to analyze the impact of peer education on tooth-brushing behavior among students of Madrasah Ibtidaiyah (MI) 11 Bonelemo, Bajo Barat, Luwu. The research employed a quantitative experimental approach, with 38 students from grades 3–5 serving as participants, divided into treatment and control groups. Class leaders were trained as peer educators to deliver tooth-brushing education grounded in the Health Promotion Model (HPM). The results showed significant improvements in tooth-brushing frequency and quality in the treatment group compared with the control group ($p<0.05$). It confirms the effectiveness of peer education in encouraging children's health behaviors. In the madrasah context, this approach aligns with Islamic values that emphasize cleanliness, as reflected in the saying of the Prophet Muhammad SAW: "Cleanliness is part of faith."

Keywords*: children, madrasah, oral health, peer education, tooth-brushing behavior.*

Abstrak

Kesehatan gigi dan mulut merupakan aspek penting dalam meningkatkan kualitas hidup anak. Data Riskesdas 2018 menunjukkan prevalensi karies gigi di Indonesia mencapai lebih dari 88%. Kondisi di Kabupaten Luwu juga memperlihatkan tingginya angka karies pada anak sekolah. Meski demikian, belum banyak penelitian yang mengkaji efektivitas intervensi peer education terhadap perilaku menyikat gigi anak di lingkungan madrasah yang sarat dengan nilai-nilai keislaman. Penelitian ini bertujuan untuk menganalisis pengaruh peer education terhadap perubahan perilaku menyikat gigi siswa Madrasah Ibtidaiyah (MI) 11 Bonelemo, Bajo Barat, Luwu. Metode penelitian menggunakan eksperimen dengan pendekatan kuantitatif. Sampel berjumlah 38 siswa kelas 3–5, dibagi menjadi kelompok perlakuan dan kontrol. Intervensi dilakukan dengan melatih ketua kelas sebagai pendidik sebaya (peer educator) yang memberikan edukasi menyikat gigi sesuai Health Promotion Model (HPM) dan dianalisis menggunakan uji paired t-test serta Wilcoxon melalui program SPSS versi 21.0. Hasil penelitian menunjukkan adanya peningkatan signifikan pada frekuensi dan kualitas menyikat gigi siswa kelompok perlakuan dibandingkan kelompok kontrol ($p<0,05$). Temuan ini menegaskan Temuan ini memberikan dasar empiris bagi pengembangan model promosi kesehatan berbasis nilai religius di sekolah-sekolah Islam. Dalam konteks madrasah, pendekatan ini sejalan dengan nilai Islam yang menekankan pentingnya kebersihan, sebagaimana sabda Nabi Muhammad SAW bahwa "kebersihan sebagian dari iman".

Kata Kunci*,: anak, kesehatan gigi, madrasah, peer education, perilaku menyikat gigi.*

Introduction

Oral health is a vital aspect of enhancing a child's quality of life, as it impacts comfort, self-confidence, and learning ability. However, nationally, dental health remains a serious challenge in Indonesia. Data from the Basic Health Research (Riskesdas) (Ministry of Health of the Republic of Indonesia, 2023) show that the prevalence of dental caries exceeds 88%, while a World Health Organization (WHO, 2022) report estimates that approximately 3.5 billion people worldwide suffer from dental and oral health problems.[1] In South Sulawesi, the prevalence of caries reached 68.4%, including in Luwu Regency, where school-age children also showed high rates.[2] A 2025 examination by the Bajo Barat Community Health Center found that more than half of the students at Madrasah Ibtidaiyah (MI) 11 Bonelemo had cavities. This condition indicates a low level of children's awareness of maintaining dental and oral hygiene, as well as the limited effectiveness of conventional promotional approaches, such as annual school counseling.[3]

From an Islamic perspective, personal hygiene, including dental care, is a fundamental aspect of religious teachings. The Prophet Muhammad (peace be upon him) said, "Cleanliness is part of faith".[4] He emphasized the use of siwak as a highly recommended sunnah, particularly before prayer and Quran reading, as a means to maintain oral health with its dual health and spiritual dimensions. Therefore, tooth-brushing education in madrasas not only promotes physical health but also strengthens children's Islamic identity through hygiene practices that have both medical and religious dimensions.[5] However, in fact, dental and oral health are still public health problems in Indonesia.

In the West Bajo region, the Bajo Barat Community Health Center focuses on promotive and preventive methods, including counseling and annual dental and oral health checks. Based on the results of periodic student check-ups in West Bajo, especially in the capital area of Bajo Barat sub-district, Bonelemo itself, the situation remains very concerning. In 2025, as many as 29

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[1] World Health Organization (WHO). 2022. *Oral Health Fact Sheet*. Geneva: World Health Organization. https://www.who.int/news-room/fact-sheets/detail/oral-health

[2] Kemenkes RI (Badan Kebijakan Pembangunan Kesehatan). (2023). *Survei Kesehatan Indonesia (SKI) 2023 dalam Angka*. Jakarta: Kemenkes BKPK

[3] Rahmawati, Nurul, dan Sitti Rahmah. "Efektivitas Edukasi Sebaya terhadap Peningkatan Perilaku Menyikat Gigi Siswa Sekolah Dasar di Makassar." *Jurnal Promosi Kesehatan Indonesia* 16 (2): (2021): 123–132. https://doi.org/10.14710/jpki.16.2.123-132

[4] Muslim. Sahih Muslim*. Terjemahan Bahasa Inggris oleh Abdul Hamid Siddiqi. Lahore, Pakistan: Sh. Muhammad Ashraf, 1975, no. 223

[5] Alyahya, A., and F. Assery. 2023. "Oral Health and Islamic Teachings: Integrating Faith and Hygiene in Health Promotion." *Journal of Religion and Health* 62 (5): 2567–2581. https://doi.org/10.1007/s10943-023-01795-4

of 57 children at SDN 33 and 43 of 73 children at Madrasah Ibtidaiyah 11 in Bonelemo Village were found to have cavities or caries. It indicates that there is still insufficient attention to children's dental and oral hygiene, leading to increased caries. It suggests that the results of promotive approaches, such as counseling, remain suboptimal, so a more effective approach is needed that is relevant to the child's social context. One practical approach to changing behavior is through health promotion using peer education, where students of the same age serve as agents of change.

The health promotion approach, which uses adults as educators — such as teachers, parents, or health workers, has several advantages.[6] However, even though adults as educators have experience and authority, this approach is often less practical for young age groups in terms of lack of social closeness and relevance, psychological comfort due to distance that makes it difficult to have open discussions, especially on sensitive issues, the effectiveness of communication that is less flexible in language and delivery style which has an impact on the delivery of information where adults may use terms or communication methods that are not appropriate to the culture or language of the target group, for example teenagers or young people.[7]

In the context of dental health promotion, the peer education approach is expected to convey and facilitate the internalization of information more easily by children.[8] A 2021 study found that peer education was 1.5 times more effective at improving adolescent girls' reproductive health knowledge. Peer education is often more effective in bridging communication because it addresses psychological, social, and cultural aspects relevant to the audience. [9] Peer education methods, in which students of the same age serve as agents of change, are effective across a range of health interventions. This model leverages social influence among peers to improve health knowledge and behaviors.[10]

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[6] Akera, P., S. E. Kennedy, R. Lingam, et al. "Effectiveness of Primary School-Based Interventions in Improving Oral Health of Children in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis." *BMC Oral Health*22 (2022): 264.

[7] Dadipoor, S., F. Akbarizadeh, M. Ghaffari, A. Alipour, dan A. Safari-Moradabadi. "Educational Intervention of Improve Student's Oral Health: A Systematic Review and Meta-Analysis School-Based." *Iranian Journal of Public Health* 52, no. 3 (2023): 500-514.

[8] Fitriani, Ani, dan Nur Aisyah. "Hubungan Pengetahuan dan Sikap dengan Perilaku Menyikat Gigi pada Anak Sekolah Dasar di Kabupaten Gowa." *Media Kesehatan Gigi: Politeknik Kesehatan Makassar* 19 (1): (2020): 45–54. https://doi.org/10.24198/mkg.v19i1.31245

[9] Nazari, Abouzar; Hajihashemi, Mina; Safavi, Seyyed Roghayeh; Ataei, Raziyeh; Hosseinnia, Maede, "Health Promotion Theory-Based Educational Interventions for Improving Oral Health in Children and Adolescents: A Systematic Review and Meta-Analysis," *BMC Oral Health* 25, (2025): Article nomor 1

[10] Pender, Nola J., and Alwilda W. Garcia. 2011. "Health Promotion Model." *Journal of Health Promotion* 25 (3): 45–52.

The Health Promotion Model (HPM), developed by Nola Pender, offers a comprehensive theoretical framework for understanding the factors that influence health behaviors. This model emphasizes individual perceptions of the benefits and barriers to healthy behaviors, as well as the importance of self-efficacy and social support in the process of behavior change.[11] The application of HBM in dental health promotion interventions is expected to strengthen students' motivation and ability to maintain their dental health.[12]

Previous research has shown that theory-based interventions combining peer education methods and theoretical approaches, such as HPM, can improve tooth brushing frequency and dental health knowledge in children. For example, a study in Hong Kong by Xiang B found that a peer-led intervention combining HPM and Social Cognitive Theory effectively improved tooth brushing behavior and dental health-related quality of life in adolescents.[13] Recent systematic reviews and meta-analyses also confirm that theory-based oral health promotion interventions (including HPM, SCT, and TPB) significantly improve tooth-brushing behavior, knowledge, attitudes, and self-efficacy in children and adolescents compared to traditional educational methods.[14] However, no research has yet integrated a peer education approach with the Health Promotion Model framework in the context of basic Islamic education. Yet integrating religious values into health education can strengthen children's spiritual motivation to maintain cleanliness as part of their religious obligations. Research that combines a scientific approach with Islamic values is needed to develop a more contextually grounded alternative health promotion model for madrasas, particularly in rural areas such as Luwu.

Method

This study used a quantitative experimental design with control and treatment groups. The sample was 38 students in grades 3–5 of Madrasah

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[11] Hosseini, M. S.; Rakhshanderou, S.; Safari-Moradabadi, A.; et al., "Effectiveness of a School-Based Oral Health Literacy Promotion Intervention: a Randomized Controlled Trial (RCT) Among Adolescents," *BMC Public Health* 25, (Mei 2025): 1982.

[12] Pender, Nola J., and Alwilda W. Garcia. 2011. "Health Promotion Model." *Journal of Health Promotion* 25 (3): 45–52.

[13] Xiang, Bilu, Hai Ming Wong, and Colman P. J. McGrath. 2022. "The Efficacy of Peer-Led Oral Health Programs Based on Social Cognitive Theory and Health Belief Model Among Hong Kong Adolescents: A Cluster-Randomized Controlled Trial." *Translational Behavioral Medicine* 12 (3): 423-432.

[14] Nazari, Abouzar, Mina Hajihashemi, Seyyed Roghayeh Safavi, Raziyeh Ataei, Maede Hosseinnia. 2025. "Health Promotion Theory-Based Educational Interventions for Improving Oral Health in Children and Adolescents: A Systematic Review and Meta-Analysis." *BMC Oral Health* 25 (1153).

Ibtidaiyah 11 Bonelemo, selected purposively. This location was chosen because it is the area where the researchers have worked for many years. Class leaders were trained as peer educators and then provided tooth-brushing education for two weeks. The instrument used was a Health Promotion Model (HPM)-based questionnaire to assess perceptions of benefits, barriers, self-efficacy, and tooth-brushing behavior.[15] Before being used in the study, the instrument underwent validity and reliability testing. Content validity testing was conducted by three experts in public health, Islamic education, and health promotion to ensure the items' suitability to the HPM theoretical constructs and the madrasah context. Empirical validity testing was conducted using a Pearson Product-Moment correlation test on 30 trial respondents at a madrasah different from the primary research location, and all items had calculated r values > the r table value (0.361), indicating that each item was valid. Meanwhile, the reliability test using Cronbach's Alpha yielded an α of 0.86, indicating high reliability and good internal consistency. Then, data processing and analysis in this study were carried out using SPSS version 21.0 for Windows, with the paired t-test and the Wilcoxon test.[16]

This research will be conducted in accordance with ethical principles, namely: Informed Consent. Respondents will be informed of the purpose, benefits, and the right to refuse to participate. Anonymity and Confidentiality: Respondents' identities are not included in the final data. Parental Consent: For students under 18, written consent from parents/guardians is required. Children with dental and oral health problems will be referred to the Bajo Barat Community Health Center for follow-up. Gifts are given as a token of appreciation to students who serve as research subjects.

Results and Discussion

Overview and Characteristics of Respondents

Private Elementary School (MIS) No. 11 Bonelemo is a religious-based elementary school located in Bonelemo Village, West Bajo District, Luwu Regency, South Sulawesi. The school is located in a rural area that is still relatively far from the district government center, with limited access to road infrastructure and transportation. Established in 2005, the school has received an A-grade accreditation, indicating that it has met several fundamental education quality indicators. The school has 84 students, with the number of study groups adjusted to the classroom capacity and the number of teachers. Most of the students come from farming families with lower-middle-class

[15] Pender, Nola J., and Alwilda W. Garcia. 2011. "Health Promotion Model." *Journal of Health Promotion* 25 (3): 45–52.
[16] Resnik, David B. 2018. *The Ethics of Research with Children*. Oxford: Oxford University Press.

economic backgrounds, making the school a primary focus for access to basic education in the region.

With approximately 76 students, MIS 11 Bonelemo has a strong social character, with intense student interaction and high emotional closeness. It makes the school an ideal location for implementing peer education as an educational strategy. This approach encourages students to become educators for their peers, making the learning process more communicative, interactive, and appropriate to the children's social context. The school faces limitations in supporting health promotion facilities, including the absence of an active UKGS (*Usaha Kesehatan Gigi Sekolah*) program and the lack of regular outreach activities by health workers. Therefore, strengthening the promotion of healthy behaviors, such as proper and regular tooth brushing, is urgent. Furthermore, the economic background of families, mostly farmers and fishermen, often means that health education is not a priority at home.

The intervention activities included oral health education, training on proper tooth-brushing techniques, and peer mentoring for a specific period. Given the school's limited access to optimal healthcare, these activities directly influenced behavioral change and increased students' awareness of the importance of maintaining dental hygiene from an early age. Furthermore, teacher involvement and collaboration with the Bajo Barat Community Health Center strengthened the program's post-intervention sustainability. Involving teachers in the intervention would likely improve research results.

Overall, MIS No. 11 Bonelemo serves not only as a research location but also as a model for school-based health education interventions in rural areas. The supportive social environment and students' enthusiasm for peer education activities significantly contribute to the primary objective of this thesis: to analyze the influence of the peer education approach on changes in children's tooth-brushing behavior. The characteristics of the respondents are as follows:

Table 1: Frequency Distribution of Respondent Characteristics by Gender

	Control Group		**Treatment Group**		**Total**	
Gender	n	%	n	%	**N**	**%**
Male	11	47,8%	12	52,2%	23	100%
Female	8	53,3%	7	46,7%	15	100%

Based on the table above, the study included 38 subjects, evenly divided into two groups: 19 (50%) in the control group and 19 (50%) in the treatment group. In the control group, 11 male subjects (47.8%) and eight female subjects (53.3%) were included. Meanwhile, in the treatment group, twelve

male subjects (52.2%) and seven female subjects (46.7%) were included. Thus, the majority of subjects in this study were male, totaling 23 subjects.

Table 2: Frequency Distribution of Respondent Characteristics Based on Age

	Control Group		Treatment Group		Total	
Age	n	%	n	%	**N**	**%**
9-10 years	17	51,5%	16	48,5%	33	100%
11-12 years	2	40%	3	60%	5	100%

Based on the table above, respondents are divided into two age groups: 9-10 years old and 11-12 years old. In the control group, 17 subjects were aged 9-10 years (51.5%) and 2 were aged 11-12 years (40%). Meanwhile, in the treatment group, 16 subjects were aged 9-10 years (48.5%) and three were aged 11-12 years (60%). Thus, the majority of subjects in this study were in the 9-10 age group, namely 33 subjects.

Table 3: Frequency Distribution of Respondent Characteristics by Class

	Control Group		Treatment Group		Total	
Class	n	%	n	%	**N**	**%**
3 SD	7	50%	7	50%	14	100%
4 SD	7	50%	7	50%	14	100%
5 SD	5	50%	5	50%	10	100%

Based on the table above, the respondents' characteristics are known by grade, divided into three grades: grades 3, 4, and 5. In the control and treatment groups, there were seven subjects from grade 3 (50%), seven from grade 4 (50%), and five from grade 5 (50%). Thus, the distribution of subjects by grade in this study was even, but the majority were in grades 3 and 4.

Table 4: Frequency Distribution of Respondent Characteristics Based on Tooth Brushing Discussion Habits

	Control Group		Treatment Group		Total	
Tooth Brushing Discussion	n	%	n	%	**N**	**%**
Yes	7	41,2%	10	58,8%	17	100%
No	12	57,1%	9	42,9%	21	100%

Based on the table above, the characteristics of respondents are known based on their habit of discussing tooth brushing. In the control group, only seven subjects (41.2%) reported discussing it, while twelve subjects (57.1%) had never discussed it. Meanwhile, in the treatment group, 10 subjects (58.8%) had discussed it, and 9 (42.9%) had never discussed it. Overall, 17

subjects had discussed tooth brushing, while 21 had never brushed their teeth. Thus, the majority of subjects in this study were not accustomed to discussing tooth brushing behavior.

Treatment Before and After Intervention

Based on the paired t-test and Wilcoxon test in Table 5 below, a significant increase was observed in all variables in the treatment group after the intervention. Statistical tests revealed significant differences in all variables between the treatment group and the control group following the peer education intervention. Based on the paired t-test and Wilcoxon Signed-Rank Test, there was a significant increase in perceived benefits, self-efficacy, attitudes toward the behavior, and social support in the treatment group ($p < 0.05$). Conversely, perceived barriers to tooth brushing decreased significantly after the intervention. Meanwhile, in the control group, changes were relatively small and insignificant in most variables, except for aspects of attitude and interpersonal support. Overall, the inter-group comparison showed that increases in tooth brushing behavior and its supporting variables were significantly greater in the treatment group than in the control group, confirming the effectiveness of peer education in influencing changes in children's health behavior.

The average score for perceived benefits increased from 26.47 to 35.58, while the average score for perceived barriers decreased from 18.68 to 12.68. It indicates that respondents were increasingly aware of the benefits of tooth brushing and perceived fewer barriers after the intervention. In terms of perceived self-efficacy, the average score increased from 18.47 to 27.42, indicating respondents felt more capable of performing the tooth-brushing behavior. Similarly, attitudes toward the behavior rose from 14.47 to 22.37, indicating a positive change following the intervention.

The interpersonal influence factor also increased its average score from 20.47 to 26.63, indicating stronger social support. Similarly, situational influence increased from 16.95 to 23.42, and the ability to plan actions rose from 17.74 to 22.11. Furthermore, actual behavior, as measured by tooth-brushing frequency, also showed significant changes. The average score increased from 4.58 before the intervention to 6.21 after. The statistical test results showed that all variables had p-values of 0.000 ($p < 0.05$), indicating a highly significant difference between the pre- and post-intervention periods. Thus, the intervention proved effective in improving respondents' perceptions, attitudes, supporting factors, and tooth-brushing behavior in the treatment group.

Table 5: Test of Differences in Tooth Brushing Behavior Before and After Intervention in the Treatment Group

	Treatment Group				
	Pre		Post		
Paired t-test*	Mean	Sd	Mean	Sd	***p-value***
Perception of Benefits	26,47	1,89	35,58	1,74	0,000
Perception of Barriers	18,68	1,70	12,68	1,20	0,000
Perception of Self-Efficacy	18,47	1,50	27,42	1,38	0,000
Attitudes Toward Behavior	14,47	1,21	22,37	1,01	0,000
Interpersonal Influences	20,47	1,89	26,63	1,53	0,000
Situational Influences	16,95	1,64	23,42	1,17	0,000
Ability to Plan Action	17,74	1,40	22,11	1,10	0,000
Uji Wilcoxon**					
Tooth-brushing Behavior	4,58	1,01	6,21	0,71	0,000

Normal Data *
Abnormal Data **
p<0,05 (There is a difference)

Furthermore, the test of Differences in Children's Tooth-brushing Behavior Scores in the Control Group Before and after intervention treatment with the Health Promotion Model Approach showed an increase in the average score after the study period. However, not all differences were significant. The average score for perceptions of benefits increased slightly from 28.47 to 28.84 (p = 0.005), indicating a significant difference despite the relatively small increase. In contrast, perceptions of barriers and self-efficacy did not show significant changes (p = 0.578 and p = 0.746, respectively). The results indicate that, in the control group, there was no substantial improvement in terms of barriers or self-efficacy in brushing teeth, as shown in the table below.

Table 6: Test of Differences in Tooth Brushing Behavior Before and After Intervention in the Control Group

	Control Group				
	Pre		Post		
Paired t-test*	Mean	Sd	Mean	Sd	***p-value***
Perception of Benefits	28,47	2,52	28,84	2,36	0,005
Perception of Barriers	18	1,33	18,05	1,22	0,578
Perception of Self-Efficacy	18,74	1,14	18,89	1,24	0,746
Attitudes Toward Behavior	17,95	1,74	19,11	1,59	0,000
Interpersonal Influences	21,16	2,03	22,26	2,02	0,000
Situational Influences	16,47	1,83	17,26	2,02	0,000
Ability to Plan Action	17,47	1,89	18,16	1,95	0,000
Uji Wilcoxon**					
Tooth-brushing Behavior	4,74	0,99	5,26	0,93	0,002

Normal Data *
Abnormal Data **
p<0,05 (There is a difference)

Several other aspects actually experienced significant changes, namely attitudes toward behavior, interpersonal influence, situational influence, and the ability to plan actions (p = 0.000 for all variables). This improvement may be influenced by external factors, such as daily experiences, environmental influences, or social interactions, even though the control group did not receive direct intervention. Furthermore, actual behavior, as measured by tooth-brushing frequency, also increased from an average of 4.74 before to 5.26 after, with a p-value of 0.002 indicating a significant difference. Overall, although the control group showed some improvement in certain aspects, the changes were relatively small compared to those in the treatment group. It confirms that the main difference in improved tooth-brushing behavior was predominantly influenced by the intervention given to the treatment group.

Next, the test of Differences in Children's Tooth-brushing Behavior Values in the Control Group and the treatment group after peer education health promotion intervention using the Health Promotion Model Approach showed a significant difference between the control and treatment groups. The average score for perceptions of benefits in the treatment group (35.58) was higher than in the control group (28.84), with a p-value of 0.000, indicating a significant difference. Conversely, perceptions of barriers were lower in the treatment group (12.68) than in the control group (18.05), with a significant difference (p = 0.000). In the aspect of perceptions of self-efficacy, the treatment group had a higher score (27.42) than the control group (18.89), as well as in attitudes towards behavior (22.37 vs 19.11), interpersonal influence (26.63 vs 22.26), situational influence (23.42 vs 17.26), and ability to plan actions (22.11 vs 18.16). All of these variables show p-values of 0.000, indicating a significant difference between the two groups, as shown in the table below.

Table 7: Test of Differences in Behavioral Values of the Control Group and Treatment Group After Intervention

Independent sample t-test*	**Mean Control**	**Mean Treatment**	***p-value***
Perception of Benefits	28,84	35,58	0,000
Perception of Barriers	18,05	12,68	0,000
Perception of Self-Efficacy	18,89	27,42	0,000
Attitudes Toward Behavior	19,11	22,37	0,000
Interpersonal Influences	22,26	26,63	0,000
Situational Influences	17,26	23,42	0,000
Ability to Plan Action	18,16	22,11	0,000
Uji Mann-Whitney**			
Tooth-brushing Behavior	5,26	6,21	0,003

Normal Data*
Abnorma Data**
p<0,05 (There is a difference)

Furthermore, actual behavior, such as tooth-brushing frequency, also showed a significant difference, with an average score of 6.21 in the treatment group compared to 5.26 in the control group (p-value = 0.003). Therefore, it can be concluded that the peer education intervention significantly improved children's perceptions, attitudes, supporting factors, and tooth-brushing behavior. These results strengthen the evidence that the peer education approach is more effective than no intervention in developing better tooth-brushing habits.

Next, the Delta Value Difference Test of Children's Tooth-brushing Behavior between the Control Group and the Treatment Group Based on Each Construct in the Health Promotion Model Approach shows that in the control group, the correlation value is r = 0.860 with a p-value = 0.000, which indicates a powerful and significant relationship between the pre-test and post-test scores of children's tooth-brushing behavior. It means that tooth-brushing behavior in the control group remained relatively consistent before and after the study, even though they did not receive any special intervention. Meanwhile, in the treatment group, the correlation coefficient is r = 0.741 (p = 0.000), indicating a strong, significant relationship between tooth-brushing behavior before and after the peer education intervention. It suggests that the behavior of children in the treatment group shifted towards the better after the intervention was given, as seen in Table 8 below.

Table 8: Test of Relationship between Tooth Brushing Behavior

Group	Pearson Correlation (r)	Sig. (2-tailed)	Description
Group	0,860	0,000	Hubungan Sangat Kuat dan Signifikan
Treatment	0,741	0,000	Hubungan Kuat dan Signifikan

Thus, both the control and treatment groups showed a significant relationship between tooth-brushing behavior before and after the study. However, the strong relationship in the control group suggests greater stability or consistency in children's behavior. At the same time, the strong relationship in the treatment group also reflects positive changes resulting from the peer education intervention.

Next, the Delta Value Difference Test of Children's Tooth-brushing Behavior between the Control Group and the Treatment Group Based on Each Construct in the Health Promotion Model Approach yielded p-values of approximately 0.000 for nearly all constructs ($p < 0.05$). It suggests a significant difference in the change in scores (delta) between the control and treatment groups after the intervention. These differences are observed in perceptions of benefits, perceptions of barriers, perceptions of self-efficacy,

attitudes towards behavior, perceptions of situational influence, and the ability to plan actions. Therefore, the peer education intervention is proven effective in enhancing positive perceptions and children's ability to brush their teeth in the treatment group compared to the control group, as shown in Table 9 below.

Table 9: Delta Value Difference Test

MANN-WHITNEY TEST	SIG. (2-TAILED)
Perception of Benefits	
Control Group* Treatment Group	0,000
Perception of Barriers	
Control Group* Treatment Group	0,000
Perception of Self-Efficacy	
Control Group* Treatment Group	0,000
Attitude Toward Behavior	
Control Group* Treatment Group	0,000
Interpersonal Influence	
Control Group* Treatment Group	1,500
Situational Influence	
Control Group* Treatment Group	0,000
Ability to Plan Action	
Control Group* Treatment Group	0,000

P<0,05 (There is a difference)

However, no significant differences were found in the interpersonal influence construct between the control and treatment groups ($p = 1.500 > 0.05$). This suggests that interpersonal factors, such as peer or family support, were relatively similar between the two groups and were therefore not significantly influenced by the intervention. Overall, these results confirm that health promotion using a peer education approach significantly affects almost all constructs in the Health Promotion Model, except for the interpersonal influence aspect, which is influenced by external factors beyond the intervention.

Before the intervention, most students only brushed their teeth once a day. After the intervention, there was a significant improvement in the treatment group, both in the frequency and the quality of tooth-brushing

technique ($p<0.05$). The results of this study indicate that the peer education approach can increase the frequency and quality of students' tooth-brushing. From a religious perspective, this aligns with the maqasid al-syari'ah (Islamic principles) of maintaining hifz al-nafs (protection of the soul) and hifz al-'aql (protection of the mind). Physically healthy children, including their teeth, will be more focused on learning, thus supporting the goal of Islamic education to shape a generation of knowledgeable and noble character.

Thus, these results indicate that family more influences children's social support in developing healthy habits than peers, especially in religious environments that place parental and teacher authority as the primary sources of moral values and behavior. Therefore, the success of peer education in improving tooth-brushing behavior should be viewed as a result of the synergy between personal motivation and religious values. At the same time, the social support dimension needs to be strengthened by involving families in health promotion programs. These findings provide direction for further research on integrating family and community approaches into an Islamic values-based peer education model in elementary schools. Peer education-based dental health promotion in madrasas is not only beneficial for health but also has religious value because it implements the command to maintain cleanliness.

These results support previous research findings that peer education is efficacious in improving health behavior. [17,18]. The success of this method is influenced by the emotional and social closeness among students, which makes health messages more easily accepted. From a religious perspective, these results indicate that implementing peer education in madrasas not only affects physical health but also supports the development of students' religious character. These findings also emphasize the importance of strengthening family and community approaches in developing an Islamic-based health promotion model. Future research should consider integrating the Health Promotion Model and Social Learning Theory to more comprehensively explain how religious, social, and psychological factors interact to shape children's health behaviors in elementary Islamic education settings.

Furthermore, religious values within the madrasa environment play a significant role in strengthening students' intrinsic motivation. The spiritual

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[17] Abdi, F., M. Simbar. 2013. The *Peer Education Approach in Adolescents:* Narrative Review Article. *Iranian Journal of Public Health* 42(11): 1200-1206.

[18] Xiang, Bilu, Hai Ming Wong, and Colman P. J. McGrath. "The Efficacy of Peer-Led Oral Health Programs Based on Social Cognitive Theory and Health Belief Model Among Hong Kong Adolescents: A Cluster-Randomized Controlled Trial." *Translational Behavioral Medicine* 12, no. 3 (2022): 423–432.

drive to maintain cleanliness as part of faith imbues healthy behavior with a sense of worship. It aligns with the principles of the Health Promotion Model, which emphasizes the importance of internal motivation in behavioral change. However, this spiritual dimension has not been widely explored in the HPM literature. Therefore, an Islamic values-based peer education approach not only strengthens behavioral change through social mechanisms but also fosters spiritual awareness as a source of sustainable motivation. These findings underscore the need to integrate the Health Promotion Model, Social Learning Theory, and religious values in the development of contextual health promotion programs in elementary Islamic schools.

Conclusion

Peer education has been shown to significantly impact tooth-brushing behavior among students at Madrasah Ibtidaiyah 11 Bonelemo. This method can be an effective strategy for health promotion in religious-based schools. In addition to improving physical health, this approach also aligns with Islamic values regarding the importance of maintaining cleanliness. In addition to enhancing students' tooth-brushing behavior, this study also shows that integrating health education with Islamic values provides a strong spiritual foundation for children. Tooth-brushing can be seen as an implementation of the Prophet's Sunnah (traditional practice) in maintaining oral hygiene. Therefore, peer education programs in madrasas should be developed with an emphasis on religious values, so that children understand that maintaining dental hygiene is not only a health obligation but also a model of holistic education grounded in faith and knowledge.

Based on the findings of this study, several recommendations can be made. In practice, schools and community health centers should integrate peer education methods into routine dental health programs, particularly in Islamic schools (madrasahs). Religious teachers can also incorporate oral hygiene materials into morality or fiqh thaharah lessons, so students understand that maintaining dental hygiene is not only important for health but also a form of worship. Furthermore, parents are expected to set concrete examples of tooth-brushing behavior at home so that this healthy habit becomes more ingrained in children. This study extends the application of HPM by incorporating religious factors as motivational determinants of health behavior. These results support previous findings that the peer education approach is effective in improving children's health behavior.[19] In addition, integrating school-

[19] Abdi, Farzaneh, and Masoumeh Simbar. "The Peer Education Approach in Adolescents—Narrative Review Article." *Iranian Journal of Public Health* 42, no. 11 (2013): 1200–1206.

based health programs aligns with systematic evidence that interventions at the elementary school level can improve children's tooth-brushing behavior, especially in developing country contexts.[20]

Thus, future promotive intervention models can be developed more contextually, particularly in religious-based schools, so that health promotion emphasizes not only medical aspects but also strengthens spiritual motivation. Methodologically, further research is recommended using a longitudinal design to assess the sustainability of peer education interventions over a longer period. This approach will help evaluate the extent to which tooth-brushing behaviors formed through peer education can be maintained after the program ends. Furthermore, similar research can be expanded to various school contexts, both madrasahs and general schools, to compare the effectiveness of this method in different social environments. Thus, the research results are expected not only to strengthen the theoretical basis of Islamic value-based peer education but also to provide strategic recommendations for the development of sustainable health promotion at the primary education level.

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