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Enhancing Oral Health Literacy through Interactive Educational Activity and Dental Condition Identification: A Community Service

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ABSTRACT

Background: Oral health literacy in early childhood plays an essential role in supporting optimal growth and development, yet oral hygiene practices among preschoolers remain low. The persistently high prevalence of dental caries among young children underscores the urgent need for early, age-appropriate educational interventions. The novelty of this community service lies in the use of interactive educational activities and dental condition identification. This interactive approach is particularly effective and innovative within the local community context. Objective: This study aimed to enhance oral health literacy among preschool children through interactive educational learning and dental condition identification. Method: The intervention consisted of interactive lectures, guided question-and-answer sessions, toothbrushing demonstrations, supervised group brushing practice, and basic dental examinations conducted by students of the Dentistry Professional Education Program, Faculty of Dentistry, Universitas Padjadjaran. A community service activity was conducted at PAUD TAAM Al-Musdariyah, Bandung, involving 29 children aged 4-6 years. Results: The interactive educational intervention increased children's oral health literacy regarding appropriate brushing times, methods, and toothpaste amounts, although correct brushing techniques were not yet consistently achieved. Dental examinations revealed that 72.4% of the children had dental caries. Conclusion: Interactive education learning effectively enhanced young children's understanding of oral health. The children had high dental caries. Sustained school-based education and active parental involvement are essential to establish and maintain lifelong oral hygiene habits.

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INTRODUCTION

Oral health is an integral component of children's overall well-being, forming the foundation for lifelong dental health and influencing both physical and psychosocial development (Casamassimo et al., 2009; Kassebaum et al., 2015). Poor oral hygiene during childhood can lead to pain, difficulty eating, speech problems, and reduced self-confidence, thereby adversely affecting quality of life and growth (Casamassimo et al., 2009; Huang et al., 2024).

Although pediatric dentistry has made substantial advances, dental caries remains one of the most common oral diseases in children worldwide and remains a public health concern, particularly in low and middle-income countries (Çolak et al., 2013; Petersen, 2003). The prevalence of early childhood caries (ECC) tends to be higher among lower-income populations due to limited access to dental care, low parental awareness, and inadequate preventive education (Huang et al., 2024; Kazeminia et al., 2020).

Dietary patterns play a crucial role in the development of dental caries. Excessive consumption of sugary foods and beverages increases the risk of enamel demineralization and caries formation (Sheiham & James, 2014; Moynihan & Kelly, 2014). Poor oral hygiene habits, such as infrequent toothbrushing or failure to use fluoride toothpaste, further exacerbate this risk (Levine, 2020). Socioeconomic conditions also contribute, as children from low-income families often face barriers to preventive services and timely professional dental care (Vargas & Ronzio, 2006).

In Indonesia, oral diseases, especially dental caries, remain highly prevalent among children. The 2018 National Basic Health Research (Riskesdas) reported a prevalence of oral health problems of 57.6%, with the highest proportion (67.3%) found in the 5–9 year age group (Badan Penelitian dan Pengembangan Kesehatan, 2019). These data highlight the importance of implementing early preventive strategies within school settings to establish proper oral hygiene behaviors during critical developmental periods.

Educational interventions for learning are effective in improving children's oral health literacy and oral health behaviors. Interactive learning activities such as storytelling, singing, and toothbrushing demonstrations enhance engagement and understanding of proper oral care practices (Marinho et al., 2013; Borrie et al., 2015).

This approach aligns with cognitive developmental theory, which emphasizes the importance of concrete and visual learning experiences in early childhood. Furthermore, hands-on practice such as supervised group toothbrushing can strengthen knowledge retention and promote positive behavioral change. (Fisher-Owens et al., 2007).

In light of the persistently high rates of ECC and suboptimal oral hygiene practices among young children, community-based prevention programs play a vital role in improving pediatric oral health (Petersen, 2003; Yamamoto et al., 2024). Such programs should not only provide educational activities but also include basic oral health screening to facilitate early detection and timely referral for appropriate management.

This initiative sought to foster positive oral hygiene attitudes, improve toothbrushing skills, and support early identification of dental problems, thereby supporting the development of positive oral health behaviors and overall well-being among children. Therefore, this community outreach program aimed to enhance oral health literacy through interactive educational activities and dental condition identification among preschool children.

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METHOD

This community outreach program was conducted at PAUD TAAM Al-Musdariyah, located in Lengkong District, Bandung, Indonesia. The target population comprised 29 preschool children aged 4-6 years. All participants were enrolled preschool children at PAUD TAAM Al-Musdariyah and were in early childhood (ages 4-6 years), a developmental stage in which concrete, visual, and play-based learning approaches are particularly effective. Informed consent and parental consent have been obtained from the parents before the activity.

The intervention employed an interactive lecture-based oral health education approach, a structured modification of traditional lectures in which core material is delivered in short segments interspersed with participatory activities, including guided question-and-answer (Q&A) sessions and short quizzes. This approach aimed to improve children's understanding of oral health importance and correct toothbrushing techniques using simple, age-appropriate language. A dental model was used to demonstrate proper brushing methods, followed by a guided Q&A session to reinforce key messages, and learning was then consolidated through supervised, hands-on toothbrushing practice (Imran et al., 2022).

FIGURE 1. Documentation of the community service activity

Following the education session, a basic oral health screening was conducted by students from the Dentistry Professional Education Program, Faculty of Dentistry, Universitas Padjadjaran. The noninvasive visual examination, appropriate for a school setting, was performed using standard personal protective

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equipment (gloves and masks) and a flashlight. Screening results were used to provide individualized advice to caregivers and general oral health recommendations for teachers.

Data were analyzed descriptively to provide the oral health status at PAUD TAAM Al-Musdariyah. In addition, indicators of the educational process quality, including children's participation during activities and completion of supervised, hands-on toothbrushing practice, were documented to support interpretation of program implementation and delivery.

RESULTS

The community outreach activities were conducted at PAUD TAAM Al-Musdariyah, Bandung, to improve oral health knowledge and promote positive oral health-related behaviors among preschool-aged children, involving a total of 29 preschool children. As shown in Table 1, most children were under 5 years old or exactly 5 years old (48.3% each), while one child (3.4%) was older than 5 years.

TABLE 1. Distribution of respondent characteristics

Characteristics	Number (n=29)	(%)
Age (years)		
<5 years	14	48.3
5 years	14	48.3
>5 years	1	3.4
Sex		
Male	13	44.8
Female	16	55.2

The activity sequence included interactive education on dental caries and the importance of oral hygiene, followed by a group toothbrushing session and a basic oral examination focused on caries detection. The educational session used a dental model to visualize tooth and oral structures and enhance participant engagement. The session began with a brief Q&A session to gauge baseline behaviors and knowledge related to oral health. The questions and responses are shown in Table 2.

Overall, baseline oral health literacy was limited (Table 2). Most preschool children recognized that brown discoloration is a sign of dental caries, knew that brushing should be done twice daily (morning and night), and that night-time brushing should occur immediately before bed. They also correctly identified the recommended toothbrush type (small head with soft bristles) and understood that sugary foods contribute to caries. However, knowledge gaps remained: preschool children were generally unaware that white-spot lesions can be early signs of caries; most brushed before breakfast rather than 30 minutes after eating; the majority used a full brush-length of toothpaste rather than the recommended pea-sized amount. In addition, none brushed the inner (lingual and palatal) surfaces or could correctly describe the recommended brushing motions. Most reported using side-to-side horizontal movements and did not brush the occlusal surfaces, inner surfaces, or the tongue.

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TABLE 2. Distribution of oral health literacy before interactive education learning

Question	Correct	Incorrect
Signs of dental caries	29 (100%)	0 (0%)
Toothbrushing frequency per day	29 (100%)	0 (0%)
Appropriate morning brushing time	13 (44.8%)	16 (55.2%)
Appropriate night-time brushing time	29 (100%)	0 (0%)
Amount of toothpaste to use	11 (37.9%)	18 (62.1%)
Type of toothbrush	29 (100%)	0 (0%)
Brushing motion (combined horizontal, circular, and sweeping)	4 (13.8%)	25 (86.2%)
Foods that can cause dental caries	29 (100%)	0 (0%)

Interactive education emphasized the appropriate timing and duration of brushing, and the pea-sized amount of fluoride toothpaste, using a child-sized soft-bristled brush. Correct brushing technique was taught through a song-accompanied demonstration. The educator modeled the technique using a dental model while singing. Preschool children were then asked to perform the technique while singing, following two guided repetitions led by the educator.

The brushing method, tailored to the predominant age group (4-5 years), consisted of circular motions on all outer tooth surfaces, sweeping strokes on inner surfaces, and pull strokes on occlusal (chewing) surfaces. A supervised group toothbrushing session and a basic oral examination for caries were conducted after the education. An interactive Q&A session was repeated post-examination to assess knowledge and understanding.

Dental examination findings showed that 21 of the 29 preschool children at PAUD TAAM Al-Musdariyah had dental caries. Overall, 72.4% of the participants presented with carious lesions (Table 3).

TABLE 3. Dental conditions among preschool children at PAUD TAAM Al-Musdariyah

Carious lesions	Number (n=29)	(%)
Yes	21	72.4
No	8	27.6

Post-education observations indicated improved understanding of oral health, although brushing technique was not uniformly correct. The most notable gains were in understanding the correct brushing motions (combined circular, sweeping, and pulling). Post-education responses are shown in Table 4

TABLE 4. Distribution of oral health literacy following an interactive educational activity

Question	Correct	Incorrect
Signs of dental caries	29 (100%)	0 (0%)
Toothbrushing frequency per day	29 (100%)	0 (0%)
Appropriate morning brushing time	29 (100%)	0 (0%)
Appropriate night-time brushing time	29 (100%)	0 (0%)
Amount of toothpaste to use	26 (89.7%)	3 (10.3%)
Type of toothbrush	29 (100%)	0 (0%)
Brushing motion (combined horizontal, circular, and sweeping)	20 (70.0%)	9 (31.0%)
Foods that can cause dental caries	29 (100%)	0 (0%)

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These results indicate that the interactive educational activity effectively improved oral health literacy among preschool children across most aspects of oral care, although some preschool children still require reinforcement on correct brushing technique and the appropriate amount of toothpaste. Notably, boys were more likely to continue using horizontal motions, whereas most girls successfully applied the recommended technique and could accurately describe the correct brushing motions.

DISCUSSION

The examination of preschool children at PAUD TAAM Al-Musdariyah showed that most children aged 4 to 6 years had dental caries, with a prevalence of 72.4%. This finding demonstrates suboptimal oral health status among young children in this setting. The high prevalence observed is consistent with evidence from Indonesia and other low and middle-income countries, where dental caries remains a leading oral health problem, affecting approximately 60–90% of children in comparable age groups (Petersen, 2003; Selwitz et al., 2007).

These findings suggest that oral health maintenance behaviors among young children are not yet optimal. Common contributing factors include limited parental knowledge about the importance of twice-daily toothbrushing with fluoride toothpaste, insufficient supervision of children's hygiene routines, and high consumption of sugary foods and beverages. Such factors have been widely reported in previous studies. According to the World Health Organization (WHO), consumption of free sugars exceeding 10% of total daily energy substantially increases the risk of caries, while reducing it to below 5% is recommended for more effective prevention (Sugars Intake for Adults and Children, n.d.).

The oral health education delivered in this program, using storytelling, play-based activities, and toothbrushing demonstrations, successfully engaged the children and helped them better understand key oral health messages. This approach aligns with early childhood cognitive development theory, which emphasizes the importance of concrete, visual, and hands-on learning experiences (Madanagopal, 2020). Practice-based education, such as hands-on toothbrushing demonstrations, has been shown to improve children's knowledge and skills more effectively than didactic lectures alone (Sheiham & James, 2014). The observed improvement in post education knowledge, particularly regarding brushing time, toothpaste amount, and brushing motion, supports the effectiveness of this interactive approach.

Additionally, the inclusion of basic dental screening allowed for an early detection strategy to identify children with caries for timely referral and further management. The high proportion of caries observed underscores the need for sustained, multi-level preventive interventions involving both families and schools to instill consistent twice-daily toothbrushing habits from an early age, reduce the frequency of exposure to free sugars (particularly sweetened drinks and between-meal snacks), and ensure clear referral and follow-up pathways for children with active lesions. Such integrated approaches are essential to improve long-term oral health outcomes and reduce the burden of early childhood caries.

The implications for parents is that improving oral health literacy through interactive educational activities enables them to better understand fundamental oral health concepts and recognize early signs of dental problems in their children. With greater awareness, parents are more likely to seek preventive or curative dental care earlier, reducing the risk of advanced oral diseases. In addition, increased knowledge helps parents feel more confident in guiding daily oral hygiene routines at home, thereby reinforcing positive behaviors learned through interactive educational tools.

The implication for teachers is that interactive oral health education can be incorporated into preschool learning activities to align with children's cognitive and motor development. This approach equips educators with basic skills to identify visible signs of dental problems and to communicate with parents for

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early intervention. Furthermore, interactive activities promote engagement and understanding, making oral health topics more accessible and age-appropriate for preschoolers.

The limitation of this community service is its relatively short duration and the variability in children's developmental levels. The limited time frame may not have been sufficient to ensure long-term retention of oral health knowledge or sustained behavioural change among preschool children and caregivers. Differences in age, attention span, and cognitive development may also have influenced children's ability to fully comprehend and apply the oral health information delivered through the interactive activities.

CONCLUSION

The community service program at PAUD TAAM Al-Musdariyah demonstrated that enhancing oral health literacy through interactive education learning about supervised group toothbrushing activities, children demonstrated improved understanding of the correct time to brush, proper technique, and the appropriate amount of fluoride toothpaste, although brushing skills were not yet consistently correct, and the overall dental health condition of the preschool children remained below optimal levels, with a caries prevalence of 72.4%.

This program can be replicated or scaled up to strengthen community outreach efforts at PAUD TAAM Al-Musdariyah, with implementation every six months by local dental health centers and other preschools in the surrounding area. These findings emphasize the importance of continuous, school-based oral health education and active parental involvement to establish lasting oral hygiene habits, prevent early childhood caries, and improve children's overall oral health.

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