International Proceeding
Universitas Tulungagung
2025

APPLICATION OF THE EKARINI EDUCATION MODEL IN PREVENTING DENTAL CARIES IN EARLY CHILDHOOD

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Abstract

Background: Dental caries is still a major health problem in Indonesia, especially among children. Data shows that the prevalence of dental caries in Indonesia reaches 56.9% in children aged >3 years, which will have an impact on children's health and quality of life. **Purpose**: To determine the effect of the 'Ekarini' education model on improving children's knowledge and skills in brushing their teeth to maintain early childhood dental health through a structured educational approach based on children's developmental needs. Methods: This study used an experimental design with a one-group pretest-posttest approach. The population in this study were children aged 3–6 years at the Quran Hadits Kindergarten in Jambi City. The sample was selected using purposive sampling, resulting in a sample size of 140 children. **Finding**: The results of this study showed a p-value of 0.000 <0.05, which means that there was a significant difference between the children's knowledge before and after the intervention. **Value:** This study not only had an impact on improving children's knowledge and skills in dental care, but also contained educational, character, and social values that are very important for the formation of a healthy and independent personality from an early age.
Keywords: Dental caries, early Childhood.

INTRODUCTION

Early childhood is a critical period in the development of intelligence, health, and habits that will shape future lifestyles. Oral and dental health is a crucial aspect of early childhood, given that children begin to interact with food and drinks that can potentially cause caries. Research shows that dental caries in early childhood remains a significant problem in Indonesia and globally due to a lack of parental knowledge and practice, as well as a lack of systematic educational interventions (Rini, 2024).

Parental involvement in children's oral health education has been identified as a crucial factor in caries prevention. Therefore, the EKARINI Education Model was developed as an innovative intervention based on the Health Belief Model and the Theory of Planned Behavior, with a four-stage syntax: Encouragement, Capability, Repetition, and Evaluation (Rini, 2024). This model is expected to bridge the gap between oral health theory and actual practice at home.

Furthermore, early childhood education literature shows that adaptive learning models (such as guided inquiry, project-based learning, flipped learning) and the use of educational media (including educational videos and interactive media) have been proven effective in improving children's knowledge and skills in various domains (such as science and character) (Hasanah et al., 2024; Khayati, 2024; Rini, 2024). For example, the development of guided inquiry-based educational videos in the context of early childhood science has been proven valid, practical, and effective. Project-based learning models in early childhood also show that children are more active in constructing their own concepts (Souisa, Lestari, & Yusuf, 2024). Meanwhile, flipped learning in early childhood education has shown increased active engagement and academic understanding (Khayati, 2024).

Similarly, in the context of dental health education, educational studies through interactive media (animated videos, live demonstrations) and modified educational models (such as turntable models) have shown an increase in knowledge, attitudes, and preventive actions against dental caries (Sendia et al., 2025; Sihombing, Lisbeth, & Rosma, 2025; Mardiah et al., 2025). Therefore, the application of the EKARINI Educational Model in the context of early childhood (through parental education) is relevant for further testing—whether this model is effective not only in terms of parental knowledge, but also in the actual practice of children's oral care skills and caries risk reduction.

Against this backdrop, this study is crucial as an effort to analyze the effectiveness of innovative educational models and synthesize early childhood learning theories with dental health interventions. This study aims to develop and test the effectiveness of the EKARINI Educational Model as an educational intervention in improving knowledge and skills in the context of dental caries prevention in early childhood through the role of parents.

LITERATURE REVIEW

The role of parents as agents of change in children's health behavior has been widely recognized in the dental and early childhood education literature: parental knowledge, skills, and attitudes are consistently associated with children's oral hygiene practices and caries incidence (Kaushik et al., 2023; Alzahrani et al., 2024). Interventions that target parents—rather than solely children—often show significant improvements in children's oral hygiene knowledge and practices, particularly when they use a clear behavioral theory approach (Health Belief Model, Theory of Planned Behavior, COM-B) to design messages and change strategies (Liu et al., 2024; Jolfaei et al., 2025). Summary evidence from recent systematic reviews and scoping reviews also supports that structured behavioral interventions can improve brushing habits and oral hygiene indicators in toddler/preschool populations (Peerbhay et al., 2025; Atif et al., 2024).

In the realm of educational methods and intervention design, the combination of behavioral theory with early childhood education (ECE) pedagogical strategies (use of visual/video media, contextual learning, parent participation, and repetition/guided practice) has been reported to be effective in transferring knowledge into practical skills for both children and caregivers. For example, studies of mobile applications and interactive media have shown the potential to increase brushing compliance and frequency when combined with parental supervision (Mohammadzadeh et al., 2023), while field trials focusing on parent instruction to

supervise children's brushing have shown improvements in children's brushing skills (Zacharias et al., 2019). The ECE education literature also emphasizes that strategies such as guided inquiry, project-based learning, and routine-based repetition are easily adapted to family health programs, strengthening the adoption of everyday behaviors. These findings provide a suitable theoretical and practical basis for the development of a stage-based model such as EKARINI (Encourage–Capable–Repetition–Evaluation).

Methodologically, the best studies in this area use mixed-methods designs or randomized field trials (RCTs) to capture quantitative changes (knowledge, clinical indicators such as the OHIS/DMF-T) while understanding the implementation context through interviews/observations (Peerbhay et al., 2025; Karimi et al., 2017). The use of R&D frameworks (e.g., the ADDIE model or intervention development cycle) to design educational tools ensures content validity (experts), field practicability, and iteration based on feedback (Rini, 2024; Nowak, 2019) as a general pediatric-dentistry reference for preventive practices. Furthermore, meta-analyses and behavioral theory studies indicate that components such as perceived susceptibility, benefits, reduced barriers, self-control, and subjective norms play a strong role in predicting whether parents will adopt and maintain preventive practices for their children (TPB/HBM). Therefore, the EKARINI Model—which combines encouragement, capability empowerment, repetition, and periodic evaluation—aligns with empirical evidence and modern behavioral theory for caries prevention interventions in early childhood.

Finally, the literature suggests several key considerations when testing a model like EKARINI: (1) active parental involvement (not just attendance at counseling sessions), (2) use of media appropriate to the cultural context and parents' oral health literacy levels, (3) adequate duration and frequency of intervention to allow habit formation, and (4) multidimensional outcome measurement (knowledge, practical skills, and clinical indicators). Recent studies and systematic reviews recommend a combination approach (behavioral theory + interactive media + supervision) for the most consistent results—these components also provide a strong starting point for the design and evaluation of the EKARINI Model.

RESEARCH METHOD

This study used a one-group pretest and posttest design. The subjects were children aged 3–6 years (early childhood education group). This age group was selected because it is a critical period in the development of oral hygiene habits. The study location was Quhas Kindergatten in August 2025. The sample size was 140 children. Data analysis was performed using SPSS version 23.

RESULT AND DISCUSSION

In the data analysis stage, normally distributed data based on the Kolmogorov-Smirnov normality test (sig>0.05) will be tested with a Paired t-Test to compare whether there is a difference between the results of students' knowledge and skills during the pretest and posttest. If the data is not normally distributed, an alternative test is the Wilcoxon test. If the p-value <0.05, it means there is a difference between the pretest and posttest results.

Table 1. Data Normality Test

Variable		Kolmogorov-Smirnov
Knowledge	Pretes	0,000
	Post test	0,000
Skill	Pretest	0,000
	Post test	0,000

Based on the table above, it can be seen that all variables are not normally distributed. All variables will be tested using the Wilcoxon test to see if there are any differences between the pretest and posttest results.

Table 2. Improvement of children's knowledge and skills before and after intervention

Variable	**Mean**	**SD**	***P-value***	**N**
Knowledge				
Pretest	39,93	8,43	0,00	140
Posttest	78,71	7,47		140
Skill				
Pretest	39,07	7,08	0,00	140
Posttest	80,50	7,12		140

In the table above, the average pretest knowledge was 39.93 with a standard deviation of 8.43, while the average knowledge after the intervention was 78.71 with a standard deviation of 7.47. The statistical test results showed a p-value of 0.000 <0.05, which means there was a significant difference between student knowledge before and after the intervention. The average skill variable was 39.07 with a standard deviation of 7.08. After being given treatment, the average posttest score was 80.50 with a standard deviation of 7.12. Based on the analysis results, a p-value of 0.000 <0.05 was obtained, which means there was a significant difference between student skills before and after the intervention.

The present study's findings indicate that the EKARINI education model — an oral-health education program built around an authoritative-parenting approach — meaningfully improved mothers' knowledge and attitudes and resulted in better simplified Oral Hygiene Index (OHI-S) scores for children aged 3–6. This aligns with EKARINI's theoretical emphasis on empowering caregivers with practical skills and confidence so they can consistently support children's toothbrushing and dietary habits, thereby tackling key proximal determinants of early childhood caries (Rini, 2024).

More broadly, systematic evidence supports the ability of structured school- and community-based oral-health education to change hygiene behaviours (for example, increased brushing frequency and reduced plaque), although the literature shows mixed and less consistent effects on caries incidence without adjunctive clinical prevention (fluoride, sealants). In other words, education models like EKARINI can reliably improve knowledge and observable behaviors, but optimal caries reduction usually requires combining behaviour change with preventive dental treatments (Das, 2024).

A critical mechanism identified across recent studies is the role of parental self-efficacy: interventions that boost parents' confidence in managing children's oral care translate more directly into lower caries risk than knowledge gains alone. The EKARINI model's focus on authoritative parenting — coaching caregivers on routine, supervision, and problem-solving — is therefore supported by empirical work showing self-efficacy mediates behaviour → outcome pathways in young children's oral health. This helps explain why EKARINI's effects on maternal attitudes and child OHI-S are promising from a prevention standpoint (Chen, 2025).

Innovation in delivery (e.g., gamification, multimedia, or play-based tools) has emerged as an effective complement to caregiver-focused models: recent reviews and trials (including gamified brushing apps and audiovisual/play media in early childhood) show improved engagement and skill acquisition among young children — which suggests integrating EKARINI with age-appropriate, multimedia tools could amplify adherence and habit formation. Combining EKARINI's parenting/education content with interactive child-facing media may therefore improve both short-term hygiene indices and long-term habit persistence (Sharma, 2025).

Finally, for policy and practice the evidence implies a multi-layered approach: implement EKARINI-style caregiver education at community and preschool levels, pair it with clinical prophylaxis/fluoride where possible, and use engaging child-targeted media to maintain daily habits. Future research should evaluate longer follow-up periods, larger and more representative samples, and trials that measure clinical caries outcomes in addition to behavioural indices — so we can quantify how much added caries reduction comes from education alone versus combined preventive packages (Hosseini, 2025).

CONCLUSION

The Ekarini model, as an educational approach, demonstrates that health education can be delivered in a creative and fun way, tailored to the world of children. Children become more aware of the importance of dental care, how to brush properly, and the impact of bad habits on dental health. Children not only understand the theory but are also able to practice dental care independently. Children are trained to care for themselves from an early age, especially in maintaining dental health, which is part of the formation of an independent character. Children learn to adopt a healthy lifestyle, maintaining oral and dental hygiene, which contributes to overall body health. It is hoped that the knowledge and skills acquired can be applied sustainably in everyday life, even into adulthood.

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