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Parents' Role in Preventing Dental Caries and Promoting Oral Hygiene Among Elementary Students in Surabaya

Ida Chairanna Mahirawatie
Department of Dental Health, Poltekkes Kemenkes Surabaya, Indonesia

Abstract
Dental caries is one of the most common chronic diseases in children, often resulting from inadequate oral hygiene practices and insufficient parental supervision. In Surabaya, elementary school students frequently exhibit poor dental hygiene, leading to increased risks of cavities, gum disease, and related health problems. Parents play a crucial role in shaping children's oral health habits through guidance, supervision, and creating supportive home environments. This study aimed to evaluate the implementation of parents' roles in preventing caries and improving dental hygiene among students at Galuh Handayani Inclusion Elementary School, Surabaya.

A descriptive-analytic study design was employed, involving 60 students aged 7–12 years and their parents. Data were collected through structured questionnaires, observation checklists of oral hygiene practices, and interviews with parents regarding their involvement in children's dental care routines. Statistical analyses included frequency distributions and correlation tests to examine the relationship between parental involvement and children's oral hygiene status.

The results indicated that students whose parents actively supervised tooth brushing, provided educational guidance, and monitored dietary habits had significantly lower incidences of dental caries compared to students with minimal parental involvement. Parental engagement was positively associated with children's consistent brushing, flossing, and regular dental visits. The study highlights that implementing structured parental roles, combined with school-based oral health education, can effectively improve dental hygiene behavior and reduce caries prevalence.

In conclusion, fostering active parental participation is essential for promoting oral health in elementary school students. Interventions targeting both parents and children, including training programs, awareness campaigns, and routine monitoring, are recommended to sustain long-term improvements in oral hygiene. These findings provide evidence for policymakers and school administrators to develop collaborative strategies involving families in children's dental care.

Keywords: Parental involvement, Dental caries prevention, Oral hygiene, Elementary school children, Health education, Surabaya

Introduction

Oral health is a fundamental component of overall health and quality of life. Among children, maintaining proper oral hygiene is critical, as poor oral health can lead to pain, discomfort, difficulty eating, and impaired social interactions. Dental caries, commonly known as tooth decay, is one of the most prevalent chronic conditions affecting children worldwide. It is caused by the accumulation of plaque, poor brushing habits, high sugar intake, and insufficient fluoride exposure. If left untreated, dental caries can progress rapidly, leading to tooth loss, infections, and long-term health complications. Preventing dental caries requires consistent oral hygiene practices, such as regular tooth brushing, flossing, and routine dental check-ups, as well as parental guidance and supervision.

Parents play an indispensable role in shaping children's oral health behavior. During early childhood and the elementary school years, children rely heavily on parental guidance to develop consistent hygiene habits. Parents influence children not only through direct supervision of tooth brushing and flossing but also by modeling positive behaviors, controlling diet, and reinforcing oral health education. Research has consistently shown that children whose parents are actively engaged in their dental care exhibit lower rates of dental caries and higher adherence to oral hygiene routines. In addition, parental knowledge, attitudes, and practices regarding oral health significantly affect the frequency and quality of children's oral hygiene habits. The family environment, therefore, acts as a primary context for instilling lifelong dental hygiene practices.

Despite the well-established role of parents in promoting oral health, many children continue to experience high rates of dental caries. This problem is especially evident in schools that serve diverse student populations, including children with special needs. At Galuh Handayani Inclusion Elementary School in Surabaya, students represent a range of physical, cognitive, and developmental abilities, which can create additional challenges in maintaining consistent oral hygiene practices. Inclusion schools often require tailored approaches to health education, as students may have varying levels of understanding and independence in self-care routines. In this context, parental involvement becomes even more critical, as parents can provide individualized guidance and support that complements school-based programs.

In addition to supervising daily oral hygiene, parents influence children's health behavior through education and awareness. When parents understand the causes and consequences of dental caries, they are more likely to implement preventive strategies, such as limiting sugary foods and encouraging regular dental visits. Parental involvement also strengthens the effectiveness of school-based oral health programs. While schools can provide instruction on proper brushing techniques and the importance of oral hygiene, the reinforcement of these practices at home ensures consistency and sustainability.

Furthermore, positive reinforcement and structured routines at home help children internalize healthy behaviors, which increases the likelihood of long-term adherence.

The relationship between parental involvement and children's oral health can be affected by several factors, including socioeconomic status, parental education, and access to dental care. Parents with higher levels of education tend to have better knowledge of oral health practices and are more proactive in supervising and supporting their children's hygiene routines. Conversely, limited financial resources or lack of access to dental services can hinder parents' ability to provide optimal care. In addition, cultural beliefs and practices regarding oral health may influence parental attitudes and behaviors. Understanding these factors is essential for designing effective interventions that engage parents and address barriers to consistent oral hygiene practices.

Inclusion elementary schools, such as Galuh Handayani, provide a unique context for examining parental roles in oral health. These schools integrate students with diverse abilities into mainstream classrooms, creating opportunities for peer learning and social development. However, students with special needs may require additional support for daily self-care activities, including brushing and flossing. As such, parents must work collaboratively with teachers and school staff to ensure that children receive the guidance and supervision necessary to maintain oral hygiene. This collaboration can take various forms, including training sessions for parents, home-based monitoring of brushing routines, and coordinated communication between school and home regarding oral health practices.

Research on parental involvement in oral health has demonstrated several positive outcomes. Children whose parents actively supervise tooth brushing and monitor sugar consumption typically exhibit lower incidences of dental caries. Regular parental engagement also fosters a sense of responsibility and self-discipline in children, as they learn to value and prioritize their own oral hygiene. Moreover, early establishment of healthy habits can prevent the progression of dental diseases, reducing the need for costly and invasive dental treatments later in life. Preventive strategies that emphasize parental involvement are therefore cost-effective and have significant public health benefits.

The present study focuses on evaluating the implementation of parents' roles in preventing dental caries and promoting oral hygiene among students at Galuh Handayani Inclusion Elementary School in Surabaya. By investigating how parents support their children's dental care routines, this research aims to identify effective strategies that can enhance oral health outcomes. The study examines multiple dimensions of parental involvement, including supervision of brushing and flossing, education and awareness, dietary monitoring, and collaboration with school-based health programs. Understanding these dimensions can inform the development of targeted interventions that empower parents to actively participate in their children's oral health.

Improving oral hygiene among elementary school students is not only a matter of individual health but also a broader public health concern. Dental caries can impact school attendance, academic performance, and overall well-being. Children with untreated dental problems may experience pain, difficulty concentrating, and social stigma, all of which can affect their educational and social development. By emphasizing parental roles in oral health promotion, schools and communities can create supportive environments that encourage healthy behaviors and prevent dental diseases.

In conclusion, parental involvement is a crucial determinant of children's oral health, particularly in the context of elementary education and inclusive school settings. Parents influence children's hygiene habits through supervision, education, dietary control, and reinforcement of school-based programs. Despite existing knowledge, many children continue to experience dental caries due to inconsistent parental engagement, limited access to dental care, or lack of awareness. This study seeks to explore the implementation of parents' roles in preventing dental caries and improving oral hygiene among students at Galuh Handayani Inclusion Elementary School, Surabaya. The findings are expected to provide evidence-based insights that can guide interventions aimed at enhancing parental participation, promoting sustainable oral hygiene practices, and reducing the prevalence of dental caries in school-aged children.

Methods

This study employed a descriptive-analytic research design to evaluate the implementation of parents' roles in preventing dental caries and promoting oral hygiene among students at Galuh Handayani Inclusion Elementary School in Surabaya. A descriptive-analytic design was chosen to provide a comprehensive understanding of the current practices, behaviors, and involvement of parents, while simultaneously examining the relationship between parental engagement and children's oral hygiene outcomes. The study combined quantitative data collection through structured questionnaires and observation checklists with qualitative insights obtained from semi-structured interviews with parents. This mixed approach allowed for a nuanced analysis of both measurable behaviors and contextual factors influencing parental involvement.

The research population consisted of elementary school students aged 7 to 12 years who were enrolled at Galuh Handayani Inclusion Elementary School, along with their parents or primary caregivers. Inclusion criteria for students included regular attendance at the school and the ability to participate in oral hygiene routines with parental support. Parents or caregivers were included if they were primarily responsible for supervising and guiding their children's daily oral hygiene activities. A total of 60 student-parent pairs were recruited for the study through purposive sampling, ensuring representation across different grade levels and inclusion categories. This sample size was considered adequate to capture variations in parental involvement while providing sufficient data for descriptive and inferential analyses.

Data collection was conducted in three phases. In the first phase, parents completed a structured questionnaire designed to assess their knowledge, attitudes, and practices related to children's oral hygiene. The questionnaire included sections on frequency of supervision during brushing and flossing, awareness of dental caries and its prevention, dietary monitoring practices, and engagement with school-based oral health programs. Each item was measured using a Likert scale to quantify the degree of parental involvement, with higher scores indicating more active engagement. The questionnaire was pre-tested on a small sample of parents to ensure clarity, reliability, and

validity of the items. Necessary adjustments were made to improve comprehension and reduce ambiguity before the main data collection.

The second phase involved direct observation of children's oral hygiene practices at home. Parents were asked to demonstrate or report typical daily routines, including tooth brushing techniques, duration, and frequency. Observation checklists were used to record adherence to recommended practices, including brushing twice a day, proper brushing duration, use of fluoride toothpaste, and flossing habits. These observations were complemented by self-reported information from parents to triangulate the data and ensure accuracy. The combination of observation and self-reporting helped mitigate potential biases and provided a more comprehensive understanding of children's oral hygiene behaviors.

In the third phase, semi-structured interviews were conducted with parents to explore qualitative aspects of their involvement. Interviews focused on parents' perceptions of their role in promoting oral health, challenges faced in supervising children's hygiene routines, and strategies used to encourage consistent practices. Interviews were audio-recorded with participants' consent and later transcribed for analysis. The qualitative data were analyzed thematically to identify recurring patterns, attitudes, and contextual factors that influenced parental engagement. This approach allowed for the integration of rich, descriptive insights with the quantitative findings from questionnaires and observations.

Data analysis was conducted in multiple stages to ensure accuracy and meaningful interpretation. Quantitative data from questionnaires and observation checklists were entered into a statistical software program for descriptive and inferential analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize parental knowledge, attitudes, and practices. To examine the relationship between parental involvement and children's oral hygiene outcomes, correlation analyses were performed, with significance levels set at 0.05. These analyses allowed the identification of specific parental behaviors that were most strongly associated with reduced incidence of dental caries and improved hygiene practices.

Qualitative data from interviews were analyzed using thematic content analysis. Transcripts were read repeatedly to identify emerging themes and patterns related to parental roles, motivations, challenges, and strategies for promoting oral hygiene. Codes were assigned to relevant segments of text, and similar codes were grouped into overarching themes. This analysis provided a contextual understanding of the factors that influenced parental engagement, including socioeconomic conditions, cultural beliefs, time constraints, and access to dental care resources. Triangulation of qualitative and quantitative data enhanced the validity of the findings and provided a comprehensive understanding of the implementation of parental roles in oral health promotion.

Ethical considerations were rigorously observed throughout the study. Approval was obtained from the school administration and parents provided informed consent for their participation and their children's involvement in observations. Confidentiality and anonymity were maintained by assigning unique codes to participants, ensuring that personal identifiers were not linked to the data. Parents were informed of their right to withdraw from the study at any time without consequences, and efforts were made to minimize any potential discomfort during observations or interviews. The ethical protocol ensured that the study adhered to established principles of respect, beneficence, and transparency.

To enhance the reliability of the data, several measures were implemented. The questionnaire and observation checklist were pre-tested to ensure clarity and internal consistency. Multiple researchers were involved in the observation phase to reduce observer bias, and discrepancies in ratings were discussed and reconciled. During interviews, open-ended questions were used to allow parents to express their experiences freely, and researchers employed probing techniques to clarify ambiguous responses. Data from different sources were compared and cross-verified to ensure coherence and credibility. These strategies strengthened the trustworthiness and replicability of the research methodology.

Limitations of the study were acknowledged and addressed. The reliance on self-reported data from parents could introduce social desirability bias, as participants might overstate their involvement in their children's oral hygiene. Observation checklists were employed to mitigate this limitation, providing objective verification of reported behaviors. Additionally, the study was conducted in a single inclusion elementary school, which may limit the generalizability of findings to other school settings. However, the detailed description of the methodology and contextual factors allows other researchers to replicate the study in similar or different settings to validate and extend the findings.

In summary, this study employed a descriptive-analytic design combining quantitative questionnaires, direct observation, and qualitative interviews to evaluate parental involvement in children's oral hygiene at Galuh Handayani Inclusion Elementary School. Participants included 60 student-parent pairs, selected through purposive sampling to ensure representation across grades and inclusion categories. Data were collected in three phases, addressing parental knowledge, supervision, practices, and perceptions. Quantitative data were analyzed using descriptive statistics and correlation analyses, while qualitative data were examined through thematic content analysis. Ethical principles were strictly adhered to, and measures were implemented to ensure reliability and validity. The comprehensive methodology provides a replicable framework for assessing parental roles in promoting oral health among elementary school students and informs the development of targeted interventions to reduce dental caries and improve hygiene practices.

Results

This study investigated the implementation of parents' roles in preventing dental caries and promoting oral hygiene among students at Galuh Handayani Inclusion Elementary School in Surabaya. Data were collected from 60 student-parent pairs through structured questionnaires, observation checklists, and semi-structured interviews. The results are presented in terms of parental knowledge, attitudes, practices, children's oral hygiene behaviors, and correlations between parental involvement and oral health outcomes.

Parental Knowledge of Oral Health
The first area examined was parental knowledge regarding dental caries and preventive oral hygiene practices. Questionnaire responses indicated that 85% of parents were aware that regular tooth brushing and flossing could prevent dental caries, while 78% correctly identified the role of sugar consumption in the development of tooth decay. However, only 62% of parents were aware of the recommended frequency of dental check-ups for children, and 55% understood the importance of fluoride toothpaste. When asked about common signs of dental caries, 72% of parents could correctly identify cavities and gum inflammation as indicators of poor oral health. The mean knowledge score for all participants was 7.8 out of 10, indicating a generally good understanding of oral health principles, though gaps existed in specific areas such as preventive care routines and fluoride use.

Parental Attitudes Toward Oral Hygiene
Parental attitudes toward involvement in children's oral hygiene were generally positive. Approximately 90% of parents agreed that supervising tooth brushing was an important responsibility, and 87% believed that teaching children proper brushing techniques at home was essential. Moreover, 82% of parents expressed willingness to participate in school-based oral health programs and workshops. Less pronounced, however, was the perception of the impact of parental involvement on long-term health; only 65% strongly agreed that their guidance could significantly reduce the risk of dental caries over time. The mean attitude score was 8.1 out of 10, reflecting a positive disposition toward oral health promotion despite moderate uncertainty regarding the long-term effects.

Parental Practices in Supporting Oral Hygiene
The study also assessed actual practices implemented by parents in supervising and guiding their children's oral hygiene routines. Observations and self-reports revealed that 75% of parents actively monitored their children brushing twice daily, while 68% regularly reminded children to floss at least once a day. Approximately 60% of parents limited sugary snacks between meals, and 58% ensured children attended routine dental check-ups. Notably, 40% of parents reported challenges in maintaining consistent supervision due to work schedules or other responsibilities. Among families of children with special needs, 35% required additional strategies such as visual reminders or step-by-step guidance to ensure proper brushing. Overall, the mean parental practice score was 7.5 out of 10, indicating relatively high but not universal adherence to recommended oral hygiene support.

Children's Oral Hygiene Behaviors
Observation checklists completed during home visits and parent reports provided data on children's actual oral hygiene behaviors. The findings indicated that 72% of students brushed their teeth at least twice daily, 65% brushed for the recommended two minutes or more, and 55% regularly used fluoride toothpaste. Flossing habits were less consistent, with only 40% of students reporting daily flossing. Dietary monitoring was reflected in children's consumption patterns: 58% limited sugary snacks to designated times, while 42% consumed sweets more frequently than recommended. The incidence of visible dental caries, as assessed by a basic visual inspection conducted in collaboration with school health personnel, was observed in 35% of the students, with higher prevalence among those with less consistent brushing and lower parental supervision scores.

Correlation Between Parental Involvement and Oral Hygiene Outcomes
The relationship between parental involvement and children's oral hygiene behaviours was examined using correlation analysis. A positive correlation ($r = 0.68$, $p < 0.01$) was found between parental supervision during brushing and children's adherence to twice-daily tooth brushing. Similarly, parental monitoring of flossing was moderately correlated with children's daily flossing habits ($r = 0.54$, $p < 0.05$). Parents who implemented dietary restrictions and limited sugary snacks were associated with lower incidence of dental caries in their children ($r = -0.61$, $p < 0.01$). Participation in school-based oral health programs was also positively correlated with children's correct brushing techniques ($r = 0.49$, $p < 0.05$). These findings indicate a measurable link between the degree of parental involvement and positive oral hygiene behaviors in students.

Qualitative Insights from Interviews
The semi-structured interviews with parents provided additional context regarding their involvement. Several themes emerged. First, parents emphasized the importance of routine and consistency. Many noted that establishing a daily brushing schedule, supported by reminders and supervision, was critical to ensuring children maintained good oral hygiene. Second, parents described challenges, including balancing work responsibilities and managing children with varying levels of independence or special needs. For example, some parents reported using visual cues, charts, and step-by-step guidance to encourage proper brushing in children who required additional support. Third, parents highlighted the role of collaboration with school programs. Those who attended school workshops or received guidance from teachers reported feeling more confident in teaching and supervising oral hygiene at home. Finally, parents acknowledged that modeling behavior was influential; children were more likely to brush and floss regularly when observing consistent practices by their caregivers.

Parental Engagement Across Different Student Groups
The study also examined differences in parental involvement between general education students and students with special needs. Among parents of children with special needs, supervision and guidance were more intensive, with 80% reporting hands-on assistance during brushing, compared to 60% among parents of general education students. Despite higher supervision, children with special needs exhibited slightly lower adherence to recommended flossing routines (35% versus 45%) and slightly higher incidence of visible dental caries (40% versus 32%). These differences highlight variations in the type and intensity of parental involvement required to support oral hygiene across different student groups.

Barriers to Parental Implementation
Parents reported several barriers that limited their ability to consistently support oral hygiene. Work schedules were the

most frequently cited challenge, with 38% of parents indicating limited time for supervision in the mornings and evenings. Lack of knowledge regarding proper techniques and preventive strategies was reported by 28% of parents, while 25% cited children's resistance or forgetfulness as obstacles. In families with limited financial resources, 15% of parents noted challenges in accessing dental care services or purchasing fluoride toothpaste. These barriers provide context for the variations observed in parental practices and children's oral hygiene behavior.

Summary of Findings

Overall, the results demonstrate that parents at Galuh Handayani Inclusion Elementary School generally possess good knowledge of oral health and positive attitudes toward their role in promoting hygiene. Most parents actively supervise tooth brushing and provide dietary guidance, though consistency varies due to time constraints and other challenges. Children's oral hygiene behavior, including brushing frequency, technique, and flossing, are positively associated with the level of parental involvement. The incidence of dental caries is inversely related to parental supervision and dietary monitoring. Qualitative data further reveal that routine, collaboration with schools, modelling behavior, and adaptive strategies for children with special needs are important components of parental engagement. Barriers such as limited time, knowledge gaps, and children's resistance affect the implementation of oral hygiene practices, particularly among families with special needs students.

In conclusion, the findings objectively indicate that parental involvement is a significant factor in children's oral hygiene practices and dental health outcomes. High levels of supervision, education, dietary monitoring, and engagement with school programs are associated with better oral hygiene behavior and lower prevalence of dental caries. Variations in parental implementation, influenced by time, resources, and child-specific factors, highlight areas where additional support or intervention may be beneficial. These results provide a comprehensive overview of parental roles and their measurable impact on the oral health of elementary school students in an inclusive school setting.

Discussion

The findings of this study provide a detailed understanding of how parents at Galuh Handayani Inclusion Elementary School implement their roles in preventing dental caries and promoting oral hygiene among their children. The results indicate that parental knowledge, attitudes, and practices are generally positive and have a measurable impact on children's oral hygiene behavior. However, variations in parental implementation and barriers to consistent involvement highlight the need for targeted interventions and ongoing support. This discussion interprets the findings in relation to the research objectives, explores their implications, and situates them within broader conceptual and empirical frameworks.

Parental Knowledge and Its Influence on Oral Hygiene Practices

The study revealed that most parents possessed good knowledge about oral health, including the role of brushing, flossing, sugar consumption, and preventive dental visits. This knowledge was reflected in the relatively high mean score of 7.8 out of 10. Parents who were well-informed about the causes of dental caries and proper oral hygiene techniques were more likely to supervise their children effectively and encourage adherence to recommended routines. This aligns with the theoretical understanding that knowledge is a precursor to behavior; parents who understand why oral hygiene is important are better positioned to translate this awareness into consistent guidance and supervision. Despite high general knowledge, gaps were observed in areas such as recommended dental check-up frequency and fluoride use. These gaps may contribute to variations in children's adherence to oral hygiene practices and highlight the need for educational interventions that provide specific, actionable guidance to parents.

Attitudes Toward Parental Involvement

Positive parental attitudes toward oral hygiene emerged as a key factor influencing the implementation of preventive practices. The majority of parents expressed strong agreement with statements emphasizing the importance of supervision and teaching proper brushing techniques. These attitudes are consistent with models of health behavior, which suggest that favourable attitudes increase the likelihood of engaging in supportive actions. The moderate uncertainty observed regarding the long-term impact of parental involvement suggests that while parents recognize the immediate importance of supervision, some may not fully appreciate the cumulative benefits of consistent guidance over time. Addressing this perception through awareness campaigns or workshops could strengthen parental commitment and reinforce the value of sustained involvement in children's oral health.

Parental Practices and Implementation Challenges

Observational data and self-reports demonstrated that most parents actively supervise tooth brushing and provide guidance for flossing and dietary habits. However, adherence was not uniform, with some parents reporting difficulties maintaining consistent routines due to time constraints, work responsibilities, or children's resistance. These challenges were particularly evident among parents of children with special needs, who required additional strategies such as visual reminders or hands-on guidance. The intensity and type of parental involvement appear to be influenced by both child-specific factors and parental resources. These findings underscore the practical realities of implementing ideal oral hygiene routines and suggest that interventions must be sensitive to family circumstances, offering flexible strategies that accommodate diverse schedules and child abilities.

Children's Oral Hygiene Behaviours and Outcomes

Children's oral hygiene behaviours closely mirrored parental practices, indicating a clear relationship between parental involvement and positive health outcomes. Students whose parents monitored brushing frequency, encouraged proper technique, and limited sugary snacks demonstrated higher adherence to recommended routines and lower incidence of dental caries. Conversely, inconsistent parental supervision, less dietary monitoring, and limited engagement with school-based programs were associated with suboptimal hygiene behaviours and higher caries prevalence. These results reinforce the notion that parental

behavior is both influential and predictive of children's oral health outcomes, highlighting the importance of family-centered approaches in oral health promotion.

Correlation Between Parental Involvement and Oral Health Outcomes

The study identified statistically significant correlations between parental supervision and children's adherence to tooth brushing and flossing, as well as an inverse relationship between dietary monitoring and dental caries prevalence. These findings support existing evidence that parental involvement is a critical determinant of oral health in children. Supervised brushing and routine guidance not only ensure proper technique but also help internalize habits that are likely to persist over time. The correlation between participation in school-based programs and improved brushing techniques further emphasizes the value of collaborative approaches that integrate school education with home-based supervision. The combination of parental involvement and school support creates a reinforcing environment conducive to sustainable behavior change.

Qualitative Insights and Contextual Factors

The qualitative data provided additional context regarding parental motivations, challenges, and strategies. Parents emphasized routine, modelling behavior, and collaboration with school programs as key elements of successful involvement. These insights suggest that parental engagement is not limited to mechanical supervision but encompasses broader pedagogical and motivational components. Parents who model proper brushing techniques and actively participate in oral health education can foster a sense of responsibility and self-efficacy in children. Additionally, the use of adaptive strategies for children with special needs indicates the importance of tailoring interventions to individual requirements, ensuring that all students have equitable opportunities to develop healthy oral hygiene habits.

Barriers to Effective Parental Implementation

Several barriers were identified that limit the consistency and effectiveness of parental involvement. Work schedules, lack of time, and competing responsibilities emerged as the most frequently cited obstacles, particularly for parents who supervise children across multiple age groups. Knowledge gaps and limited confidence in correct brushing techniques were also reported, indicating that even well-informed parents may require practical guidance to implement routines effectively. Children's resistance or forgetfulness further complicates supervision, especially among younger students or those with developmental challenges. Recognizing these barriers is essential for designing interventions that provide practical support, such as flexible scheduling, instructional materials, or community-based workshops that empower parents to overcome obstacles.

Parental Involvement in Inclusive Education Settings

The findings highlight unique considerations in inclusive school environments. Parents of children with special needs reported higher levels of hands-on supervision, yet their children still exhibited slightly lower adherence to flossing and a higher prevalence of dental caries. This underscores the additional effort and specialized strategies required to support oral hygiene in students with varying abilities. Inclusive schools present both challenges and opportunities; the presence of peer role models and structured school routines can facilitate learning, but individualized guidance from parents remains critical. These insights suggest that oral health interventions in inclusive settings should adopt a dual approach, combining school-based programs with targeted home-based strategies to address diverse needs effectively.

Implications for Practice and Policy

The study's results have important implications for oral health promotion, particularly in community and school-based programs. First, parental education initiatives should focus on bridging knowledge gaps, reinforcing the importance of routine dental check-ups, and providing practical guidance for proper brushing and flossing techniques. Second, programs should consider the challenges parents face, offering flexible, accessible solutions that accommodate work schedules and other responsibilities. Third, collaboration between schools and parents should be strengthened, with regular workshops, communication channels, and coordinated strategies to support consistent oral hygiene practices. Tailoring interventions to the specific needs of children with special needs is also essential, ensuring that all students receive equitable guidance and supervision.

Strengths of the Study

This research provides a comprehensive assessment of parental roles in oral health promotion within an inclusive elementary school context. The combination of quantitative and qualitative methods allowed for triangulation of data, enhancing the reliability and depth of the findings. The inclusion of both general education and special needs students provides a nuanced understanding of how parental involvement varies across different student populations. Additionally, the study identifies specific behavior and strategies that are most closely associated with improved oral hygiene, offering actionable insights for schools, parents, and policymakers.

Limitations and Areas for Future Research

While the study provides valuable insights, certain limitations must be acknowledged. The research was conducted in a single school, which may limit generalizability to other contexts or regions. Self-reported data from parents could be influenced by social desirability bias, although observation and triangulation were used to mitigate this risk. Future studies could expand the sample size, include multiple schools, and incorporate objective dental assessments conducted by professionals to enhance accuracy. Longitudinal research would also be valuable to examine the long-term effects of parental involvement on oral health outcomes and habit formation.

Conclusion

This study highlights the significant role of parents in preventing dental caries and promoting oral hygiene among students at Galuh Handayani Inclusion Elementary School in Surabaya. The findings indicate that parents generally possess good knowledge of oral health, hold positive attitudes toward supervising and teaching proper oral hygiene, and engage in practices such as monitoring brushing, encouraging flossing, and regulating sugary food

consumption. Children whose parents were actively involved demonstrated better adherence to recommended oral hygiene routines and experienced a lower incidence of dental caries, illustrating a clear link between parental engagement and children's oral health outcomes.

Despite these positive trends, the study also identified challenges that limit consistent parental involvement, including time constraints, work responsibilities, knowledge gaps, and children's resistance to oral hygiene routines. These barriers were particularly evident in families of children with special needs, who required additional strategies to ensure proper brushing and flossing. Qualitative insights further emphasized the importance of routine, modeling behaviors, and collaboration with school-based programs to support effective oral hygiene practices.

Overall, the results underscore the critical importance of empowering parents with knowledge, practical skills, and strategies tailored to their children's needs. Strengthening collaboration between schools and families, providing targeted education, and addressing barriers to consistent supervision can enhance children's oral hygiene behaviors, reduce the prevalence of dental caries, and promote long-term oral health.

References

1. Kaskova LF, Sadovski MO, Murtazaev S, Novikova SCh, Amosova LI, Ulasevych LP, *et al*. The importance of parental involvement in the oral hygiene of children aged 3–5 years. The Medical and Ecological Problems,2024:28(1):3–10.
2. Kaskova LF, Sadovski MO, Murtazaev S, Novikova SCh, Amosova LI, Ulasevych LP, *et al*. The importance of parental involvement in the oral hygiene of children aged 3–5 years. DOAJ, 2024. https://doaj.org/article/793b2317675f4ebd869bba9dce1ed4c2
3. Wazir SU, Orakzai MA. Impact of parental literacy on dental caries of school-going children in Landi Kotal District Khyber. Journal of Wazir Muhammad Institute of Paramedical Technology,2023:1(1):1–8.
4. Zhang Y, Liao H, Xiao J, Al Jallad N, Ly-Mapes O, Luo J, *et al*. A smartphone-based system for real-time early childhood caries diagnosis. arXiv, 2020. https://arxiv.org/abs/2008.07623
5. Qi X, Lei Y, He S, Cheng S. Awayvirus: A playful and tangible approach to improve children's hygiene habits in family education. arXiv, 2023. https://arxiv.org/abs/2306.09076
6. Trella AL, Zhang KW, Nahum-Shani I, Shetty V, Doshi-Velez F, Murphy SA, *et al*. Reward design for an online reinforcement learning algorithm supporting oral self-care. arXiv, 2022. https://arxiv.org/abs/2208.07406
7. Jiang C, Zhai S, Song H, Ma Y, Fan Y, Fang Y, *et al*. Object detection for caries or pit and fissure sealing requirement in children's first permanent molars. arXiv, 2023. https://arxiv.org/abs/2308.16551