Review Article
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Nursing Implications in Managing Oral Health among Children: Narrative Review

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ABSTRACT

Background: Oral health is an essential component of nursing care, and the maintenance of oral health, through both pharmacological and non-pharmacological management, is widely employed in clinical practice to support effective oral care. In children, oral health plays a crucial role in overall wellbeing, and nurses are often among the first healthcare professionals to identify, address, and prevent oral health problems. **Objectives:** This narrative review synthesizes and analyzes the historical evolution and available evidence regarding the nursing role in managing oral health in children, with a specific focus on nurse-led practices. It explores how nurses contribute to prevention, early detection, education, and the implementation of oral care strategies. **Methods:** The review synthesized relevant studies published in English between 2001 and 2025. These studies were identified through a structured search of major scientific databases, including PubMed, Scopus, Google Scholar, and Research Gate. The review incorporated literature examining nursing interventions, oral care protocols, and the effectiveness of nurse-driven approaches in pediatric settings. **Results:** The findings highlight the significant preventive and educational impact nurses have in the oral health management of children. Nurses play an essential role in promoting oral hygiene, guiding caregivers, and implementing evidence-based practices. The review also emphasizes that nurse-led interventions contribute positively to improving oral health status, particularly when chlorhexidine (CHX) is used as part of oral care routines. **Conclusion:** Nurse-led interventions have demonstrated positive effectiveness in enhancing children's oral health outcomes. Future research should focus on the development of more organized, structured interventions and explore their long-term impact to further strengthen the role of nurses in pediatric oral health management.

Keywords: Child; Chlorhexidine; Dental Plaque; Gingivitis; Nursing

INTRODUCTION

Child health is a vital factor in the long-term development of any country and an essential part of public health (Bhakare, 2025; Ebrahim *et al.*, 2021). Oral disorders are caused by dental plaque, a bacterial biofilm that attaches to oral surfaces. It has both immediate and long-term impacts on a child's well-being; its implications extend beyond the oral cavity, influencing physical development, quality of life, and overall health (Ludovichetti *et al*., 2025; Abo-dahab *et al.*, 2025).

Most of the recent studies on children's oral health examine interventions provided by dentists or dental hygienists (Vázquez-Calatayud & García-Díez, 2025; Lee *et al*., 2024). Research is scarce about the role of nurses in the prevention and treatment of dental plaque and gingivitis. A quasi-experimental, nurse-led initiative on dental hygiene among students enhanced knowledge, attitudes, and practices regarding oral health (Mohamed *et al*., 2025). In addition, a scoping review of community nursing interventions revealed inadequate robust evidence supporting nurse-administered oral care programs for children at home, notwithstanding positive outcomes reported by other entities (Viana *et al*., 2014; Stark *et al*., 2022).

Nurses play a critical role in maintaining child health through a broad spectrum of responsibilities spanning from preventative and promotional care to therapeutic and rehabilitative services (Bhakare *et al.*, 2025). They provide care for children due to diminished awareness and an incapacity to meet their fundamental

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requirements (Anggraeni *et al.*, 2020). The practices by nurses are employed for maintaining hygiene in children, ensuring the oral cavity remains clean (Bassan *et al.*, 2018; Abo-dahab *et al.*, 2025). According to a narrative review by Sajjan *et al.* (2016), numerous studies have shown some pharmacological agents, such as chlorhexidine, to be useful as an antiplaque agent.

This narrative review synthesizes and analyzes the historical and current evidence related to the role of nursing in managing dental plaque and gingivitis in children, with a focus on antiseptic strategies such as chlorhexidine in paediatric oral health, and presents innovative nurse-led practices for hospital, school, and community settings.

METHODOLOGY

This narrative review employed a structured approach to identify and synthesize literature related to the impact of oral care interventions by nurses using antiseptic agents like chlorhexidine on children's dental plaque, gingival health, and overall oral health relative to usual care (Grant & Booth, 2009). A two-decade period from 2001 to 2025 was chosen to encompass historical modifications and current advances concerning the oral health of children, mainly focusing on the use of chlorhexidine (CHX). The literature review focused on the theme of nurse-led oral health interventions and chlorhexidine use in children.

Literature Identification

Literature was identified via a Search Scope including key articles published between 2001 and 2025 using the databases PubMed, Scopus, Google Scholar, and ResearchGate. The search utilized key terms such as "nursing," "oral health," "children," "dental plaque," "gingivitis," and "chlorhexidine." Following the search, the identified literature underwent title, abstract, and full-text screening to select studies most relevant to the review's thematic focus (Ferrari, 2015). A final set of 19 studies was selected for inclusion and synthesis, based on their relevance to nurse-led interventions and chlorhexidine use in children.

Inclusion/Exclusion Criteria

This review included randomized controlled trials, quasi-experimental studies, and observational reports targeting children aged 3– 18 years, specifically examining interventions related to nurse-led oral care or antiseptic agents like chlorhexidine. Furthermore, only articles published in English and accessible as open-access publications, with no identified geographic location, were deemed eligible.

Studies that targeted only adult populations, dental interventions performed exclusively by dentists without nursing participation, and publications that were either non-experimental or not peer-reviewed were excluded (Figure 1).

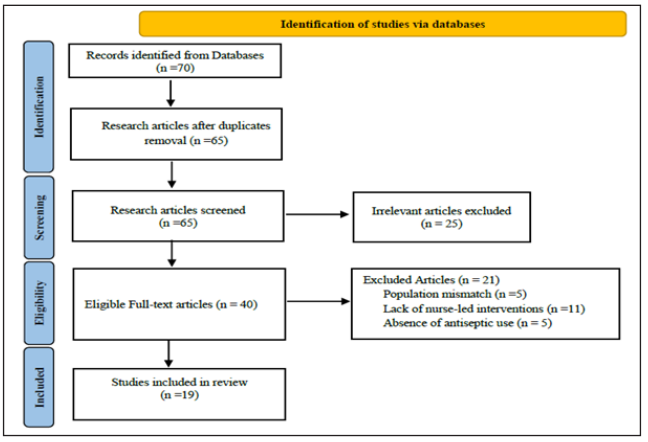

Figure 1: The Flow Diagram of the Studies' Selection Process

Data Synthesis

The details of the selected studies (authors, year, design, sample size, intervention, and major finding) were

recorded. The content was analyzed and synthesized narratively through theme comparison, emphasizing consistencies, divergences, and implications for paediatric nursing practice. This thematic synthesis offers clarity and openness, facilitating a critical evaluation of the trustworthiness and validity of the review's results (Samnani *et al.*, 2017). No formal critical appraisal or risk of bias assessment tools were applied, as this review focuses on narrative synthesis and thematic analysis.

RESULTS

Table 1: General Characteristics of the Included Studies

Authors / (Year)	Study Design	Sample Size	Population/Age	Intervention	Major Findings
Joharji & Adenubi (2001)	Clinical trial	100	7–8 and 12–14 years old children	Varnish of 1% (CHX) and thymol	Plaque reduction indirectly, by carrying out prevention.
Haukali & Poulsen (2003)	Clinical trial	85	13–16 years old schoolchildren	Chlorhexidine-thymol varnish	Reduced proximal caries and dental plaque
Pannuti *et al*. (2003)	RCT	43	Mentally handicapped children	0.5% chlorhexidine gel	Reduced gingivitis
Bozkurt *et al*. (2005)	RCT	51	Older adolescents	Oral sprays	Reduced plaque and gingival inflammation
Lorenz *et al*. (2006)	RCT	90	Adolescents	Chlorhexidine mouth rinses	Reduced plaque and gingivitis, but caused discoloration
Ersin *et al*. (2008)	RCT	149	11-13-year-olds Schoolchildren	Chlorhexidine varnish, NaF gel, and education	Similar plaque scores and modest caries increments
Rodrigues *et al*. (2008)	Clinical trial	72	6–8-year-old children	Chlorhexidine-thymol varnish	Do not reduce caries development
Chibinski *et al*. (2011)	Clinical trail	29	12-year-old children with special needs	Chlorhexidine gel and spray	reduction in dental biofilm and gingival bleeding
Viana *et al*. (2014)	Clinical trail	26	7–14 years old Children with mental health issues	Chlorhexidine spray	Significantly reduced the rates of dental and gingival biofilm
Supranoto *et al*. (2014)	Systematic review	Varies	Children	Chlorhexidine dentifrice/gel vs. mouthwash	Reduced plaque and gingivitis; discoloration noted
Cheng *et al*. (2019)	Quasi-experimental	2097	Children younger than 5 years of age	Dental education and referrals, fluoride varnish by nurses	Changes in oral health behaviors
Mandanas & Bautista (2019)	RCT	28	Healthy children	Chlorhexidine spray vs. rinse	Improved plaque control, gingival health
Ghaempanah *et al*. (2021)	Clinical trail	70	Adolescents in ICU with ETT	Oral care protocol vs 0.2% CHX	Reduced plaque and the gingival index
Bhor *et al*. (2021)	RCT	72	14–15-year-old schoolchildren	0.4% Triphala vs. 0.12% chlorhexidine	Reduced plaque, gingivitis, and microbial growth
Ebrahim *et al*. (2021)	Quasi-experimental study	60	Ventilated children in the PICU	Tooth brushing and 0.12% CHX vs routine care by nurses	Poor oral status in ventilated children
Butera *et al*. (2022)	RCT (split-mouth)	30	Children with Periodontal problems	Antimicrobial gel vs. chlorhexidine	Both are effective in-home care of children
More *et al*. (2022)	Clinical trial	60	6–14-year-old children with mixed dentition	Chlorhexidine, fluoride, combination varnish	Reduced *S. mutans* count
Basha *et al*. (2023)	RCT	45	24–36 months toddlers	Povidone-iodine vs. chlorhexidine gel	Reduced plaque regrowth
Mohamed *et al*. (2025)	Quasi-experimental	400	11–12-year-old Schoolchildren	Nurse-led oral hygiene program	Improved oral hygiene behaviors

RCT=Randomized Controlled Trial

The literature search yielded 19 articles, the characteristics of which are presented in Table 1. These studies, published between 2001 and 2025, include various empirical designs (randomized controlled trials, quasi-experimental studies, and observational reports). The synthesis focuses on nurse-led oral health interventions in school, hospital, or community settings. It examines the efficacy of chlorhexidine-based products (mouthwash, gel, varnish, and spray) within nursing practice. The review demonstrates the evolving role of nursing interventions and antiseptic agents in managing dental plaque and gingivitis in children.

Most of the selected studies reveal that nurse-led interventions can improve oral health behaviors and outcomes of children in hospital, school, and community settings (Rodrigues *et al.*, 2008; Cheng *et al*., 2019). Oral care protocols, which included mechanical, chemical, or combined approaches implemented by nurses and other health care professionals in hospitals, mainly at PICU settings, including using chlorhexidine in different forms, effectively reduced plaque, gingivitis, and mucositis in ventilated and non-ventilated pediatric patients (Bhor *et al*., 2021; Butera *et al.*, 2022). The adverse effects of CHX included discoloration and temporary discomfort. Despite these findings, there remains limited research on long-term effects, cost-effectiveness, and standardized nursing training and standards (Supranoto *et al.*, 2014).

DISCUSSION

The 19 articles published from 2001 to 2025 highlight nurse-led interventions to enhance children's oral health, utilizing diverse nursing roles through oral health assessment and education in routine care, and encourage maintenance practice. In addition to their contribution to the nursing care of the school and community health promotion. Combining chlorhexidine in nursing care has significantly decreased plaque, gingivitis, and cavities.

Historical Implications of Nursing in Oral Health

In the past, oral care was performed by nurses without any standardized strategies, administering the available solutions (Johnstone *et al*., 2010; Chibinski *et al.*, 2011). Now, trending investigation indicating a shift to structured, nurse-led practices, including education, assessment, prevention, and chemical strategies (Mohamed *et al*., 2025). This highlights the significance of formal training for nurses in areas of assessment, protocol implementation, and evidence-based prevention regarding oral health in clinical and community institutions. A descriptive study by Askari *et al*.(2025) emphasizes the importance of improving knowledge, attitudes, and practices of nurses regarding oral care for hospitalized patients, indicating that bridging existing gaps and improving patient outcomes can be achieved via targeted education.

Nurse-Led Interventions Improve Oral Health

Nurses, especially pediatric nurses, have a crucial role in enhancing the oral health of children mainly through a number of areas, including direct care, assessments, educating and encouraging families in hospitals, schools, clinics, and community environments (Mandanas & Bautista, 2019; Alenezi *et al*., 2024). They carry out infection-control practices to shield vulnerable children from healthcare infections, which is considered vital for both acute and preventive care (Al Sharif *et al.*, 2024). The nursing scope of practice has been expanded to include clinical and community duties, reflecting the evolving role of nurses in comprehensive pediatric care. Recent articles emphasize the urgency of integrating oral health with nursing intervention. Fletcher *et al*. (2024) discovered that pediatric nurses' knowledge, attitudes, practices in hospitals, and perceived barriers to oral care highlight areas that improve training and resources.

Studies have demonstrated that nursing programs have a significant impact on children's oral health, particularly in terms of knowledge, attitudes, and practices. This is evident during well-child visits, as documented by Cheng *et al.* (2019), who reported marked improvements in the frequency of brushing and fluoride toothpaste use, particularly with adult supervision, particularly in children under 18 months, through which nurses implemented a structured program that included targeted education, the application of fluoride varnish, and referrals for dental care, resulting in notable improvements in brushing frequency, the use of fluoride toothpaste, and adult supervision, particularly among children under 18 months. Additionally, a quasi-experimental study conducted in Egypt on 400 schoolchildren found that an oral hygiene program led by nurses

improved knowledge, attitudes, and practices following three educational sessions (Ghaempanah *et al.*, 2021; Mohamed *et al*., 2025). Similarly, a survey recently conducted by Nicklaus Children's Hospital (2023) to evaluate the knowledge and practices of nurses concerning oral health highlighted that nurse-led interventions improved through ongoing education and training.

Another essential aspect of nursing practices regarding children's oral health, which allows for early risk detection and preservation of children's oral health, is typically assessed through oral examination (Ali *et al*., 2022). Mouth care is usually performed by nurses using available mouthwash solutions, such as chlorhexidine, oxygenated water, or normal saline, often without relying on standardized protocols, as reported by Johnstone *et al*. (2010). Despite this, Supranoto *et al*. (2014), who conducted a systematic review, demonstrated that nurses combining mechanical oral care with antiseptics, such as chlorhexidine, significantly reduce plaque and gingivitis in children, especially in pediatric intensive care units. Effective oral hygiene regimens reduce oral mucositis. A quasi-experimental study at Assiut University Children's Hospital showed that toothbrushing with 0.12% chlorhexidine gluconate enhanced oral health in mechanically ventilated children compared to routine care (Ebrahim *et al*, 2022). Furthermore, Yavuz *et al*., (2025) scoping review of oral care in the PICU indicated that nurses commonly used chlorhexidine solutions, emphasizing the importance of establishing standardized practices in critical care. A significant portion of pediatric nursing research (38.6%) focuses on "child and family health," specifically examining self-care practices and health education. This supports the implication that nurses play a critical role in educating families about children's health management, such as oral hygiene (Shawq & Ajil, 2025).

Nurse-Led Chlorhexidine Interventions in Oral Care

Nursing care for pediatric oral health includes various methods, such as mechanical and chemical, such as chlorhexidine (CHX), which is effective in reducing plaque, gingivitis, and microbial load among children (Lorenz *et al*., 2006), in addition to combined approaches. Pains *et al.* (2024), in a recent review, talks about how CHX is used in oral care therapies and where more research is needed to make it work better in children's environments. This shows how important it is to use chemical agents in a systematic oral care regimen to keep kids from having oral health concerns.

Most of the articles comparing CHX efficacy with other non-pharmacological agents, such as Triphala or postbiotic gels, show that CHX remains highly effective. However, alternatives may offer comparable benefits without disrupting the oral microbiota. It has been demonstrated that combining the chemical with educational or mechanical strategies yields better preventive outcomes than either approach alone, especially if nurse-led intervention (Basha *et al*., 2023). Jolfaei and Tahani (2025) reported a significant improvement in brushing habits and gum health in preschool children who used an oral health education package. Nurses are the "core of the healthcare system," and their research focuses on identifying challenges in practice to improve direct care for children and their families (Shawq & Ajil, 2025).

Limitations

The lack of access to specific data, mainly evidence-based nursing research on oral health in children, longer follow-up of CHX use, and only English publications within a specific time period, limited the generalizability of findings.

CONCLUSION

This review demonstrates that nurses significantly contribute to managing dental plaque and gingivitis in children through education, preventive care, and structured antiseptic interventions. Structured, nurse-led programs improve oral health status in children in both clinical and community settings, underscoring the importance of integrating strategic oral health care practices into continuing education and nursing practice. Nurse-led oral health programs should be integrated into paediatric practice to promote sustainable outcomes. Future research should investigate cost-effectiveness, long-term outcomes, and comparative trials of nurse- versus dentist-led interventions.

Conflict of Interest

The authors declare that they have no competing interests.

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