

AWARENESS REGARDING ORAL CAVITIES AMONG INFANTS: A SYSTEMATIC REVIEW

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Abstract

Background: Oral health is a critical aspect of general well-being, with early care significantly influencing long-term health outcomes. Awareness of infant oral cavities is crucial in preventing conditions like dental caries and periodontal diseases. However, research suggests a variability in the awareness levels of caregivers and healthcare providers regarding infant oral health, which could impact oral health practices and outcomes in infants. This systematic review aims to synthesize the existing evidence on the awareness of oral cavities among infants, factors influencing this awareness, and the implications for oral health practices.

Methods: A comprehensive literature search was conducted across PubMed, Scopus, Web of Science, and Embase. Grey literature, conference proceedings, and reference lists of included studies were also explored. Studies eligible for inclusion were cross-sectional, cohort, case-control, and qualitative research that focused on caregiver or healthcare provider awareness of infant oral

health. The participants of interest were caregivers (parents, guardians) and healthcare providers responsible for infant oral health (aged 0–2 years). Study selection and data extraction were performed by two independent reviewers, with discrepancies resolved by a third reviewer. The primary outcome was the level of awareness regarding infant oral cavities, and secondary outcomes included factors influencing awareness such as education, socioeconomic status, and access to healthcare services.

Results: The initial search identified 458 studies, of which 247 articles were screened for eligibility. After full-text review, 184 articles were assessed, and three studies met the inclusion criteria. The studies included diverse populations, ranging from pediatricians and parents to nursing students and pregnant women, with sample sizes varying from 60 to 425 participants. Awareness of infant oral health was generally limited, with participants demonstrating moderate levels of knowledge and a willingness to improve through educational interventions. Factors influencing awareness included education level, socioeconomic status, and access to healthcare services. Educational programs showed promise in improving awareness and practices among caregivers and healthcare providers.

Conclusion: This systematic review highlights significant gaps in awareness regarding infant oral health across different populations. The findings emphasize the need for targeted educational campaigns and interventions to improve awareness and practice among caregivers and healthcare providers. Addressing these gaps is essential to enhancing early oral health practices and preventing dental issues in infants. Future research should focus on long-term evaluations of the effectiveness of educational programs and explore additional factors influencing awareness.

Keywords: Infant oral health, awareness, caregivers, educational interventions, dental care

Introduction

In 2019, the American Academy of Pediatric Dentistry (AAPD) defined early childhood caries (ECC) as occurring in any primary tooth of a child who is at least 71 months old and has one or more decaying, missing, or filled tooth surfaces (non-cavitated or cavitated lesions) [1].

One of the most prevalent childhood disorders is dental caries, which affects five times as many children as asthma and seven times more than hay fever combined [2,3]. According to the statistics, by the time the children were 53 years old, 67% of them would have had tooth decay. A staggering 532 million instances of untreated dental caries in deciduous teeth were documented in the 2017 Global Burden of Disease research. The terrible situation of ECC in India was highlighted in a recent systematic study that found a pooled prevalence of 46.9% and that one out of every two children in the country suffers from the condition [4].

When it comes to overall health, oral hygiene is often overlooked [4]. Because untreated ECC may cause problems with chewing, eating, speaking, and going to school, it can drastically reduce a child's quality of life [5,6].

Childhood caries are defined by smooth surface lesions that spread quickly, starting in the upper incisors and moving on to the first primary molars in both jaws as the eruption sequence dictates. Because teeth erupt later in the jaw, the canines and second molars are less likely to be damaged by poor oral hygiene, although they may get implicated in extreme situations nevertheless [7]. Serious dental pain, abscesses, bone loss, infection spreading via the bloodstream, and other complications may result from untreated caries in children and newborns [8].

Dentist visits for children under the age of three are infrequent, despite the high prevalence of dental disease in this age group. The dental health of infants may be directly influenced by pediatricians because of their early contact with youngsters [9]. They may educate parents and caregivers on how to avoid oral disease and assess the likelihood of dental issues. In addition, they may conduct screenings to detect dental issues early on, advise patients on when it's necessary to see a dentist, and refer patients in need [10].

Methods

Oral health was recognized as a fundamental aspect of general health and well-being, starting early in life. Awareness regarding oral cavities among infants was deemed crucial for preventing dental caries, periodontal diseases, and other oral conditions that could adversely affect their quality of life. Despite its significance, the level of awareness among caregivers and healthcare providers about infant oral cavities varied widely. This systematic review aimed to synthesize existing evidence on the awareness levels regarding oral cavities in infants, factors influencing this awareness, and its implications on infant oral health practices and outcomes.

Review Question

What was the level of awareness regarding oral cavities among infants, and what factors influenced this awareness?

Search Strategy

A comprehensive search was conducted across major electronic databases, including PubMed, Scopus, Web of Science, and Embase. Additional sources such as grey literature, conference proceedings, and reference lists of included studies were also explored. The search focused on studies published in English, and no restrictions were placed on publication dates to ensure a broad capture of relevant data.

Types of Studies Included

This review included cross-sectional studies, cohort studies, case-control studies, and qualitative research that examined awareness regarding oral cavities among infants. Reviews, commentaries, and opinion pieces were excluded, except where they provided relevant references for primary studies.

Participants

The primary participants of interest were caregivers, including parents, guardians, and healthcare providers, responsible for the oral health of infants aged 0–2 years. Studies focusing on infants' oral health awareness indirectly through caregivers or healthcare professionals were also included.

Search Keywords

Keywords included terms such as "oral health awareness," "infant oral cavities," "dental care for infants," "oral hygiene practices in infants," and "parental awareness of oral health." Boolean operators, truncation, and Medical Subject Headings (MeSH) terms were used to optimize the search strategy. For instance, a search string used was: ("oral health awareness" OR "dental care") AND ("infants" OR "babies" OR "young children").

Study Selection Process

The study selection process involved two stages: initial screening of titles and abstracts followed by full-text review. Two independent reviewers assessed the studies for eligibility based on predefined inclusion and exclusion criteria. Discrepancies were resolved through discussion or by consulting a third reviewer. A PRISMA flow diagram was used to document the selection process.

Outcomes

The primary outcome was the level of awareness regarding oral cavities among infants, as reported by caregivers or healthcare providers. Secondary outcomes included factors associated with awareness, such as education level, socioeconomic status, and access to healthcare services. Additionally, the review examined the impact of awareness on oral hygiene practices and infant oral health outcomes.

Data Extraction and Coding

Data from eligible studies were extracted using a standardized form. Extracted data included study characteristics (e.g., author, year, country), participant demographics, study design, methods used to assess awareness, key findings, and reported outcomes. Coding was performed to categorize and organize the data into thematic areas for analysis.

Data Management

All extracted data were stored securely using data management software such as Excel or NVivo. Files were regularly backed up, and access was restricted to authorized team members. To ensure consistency and reliability, data extraction and coding were conducted independently by two reviewers, with periodic calibration meetings held to resolve discrepancies.

Results

The initial search identified a total of 458 studies from PubMed, Embase, Cochrane Library, and CINAHL. There were 72 articles excluded due to their irrelevance or duplicates removal. At the end of identification process, 247 articles were screened. Of these, 184 full-text articles were reviewed, and three studies were eligible for inclusion in this systematic review (Figure 1).

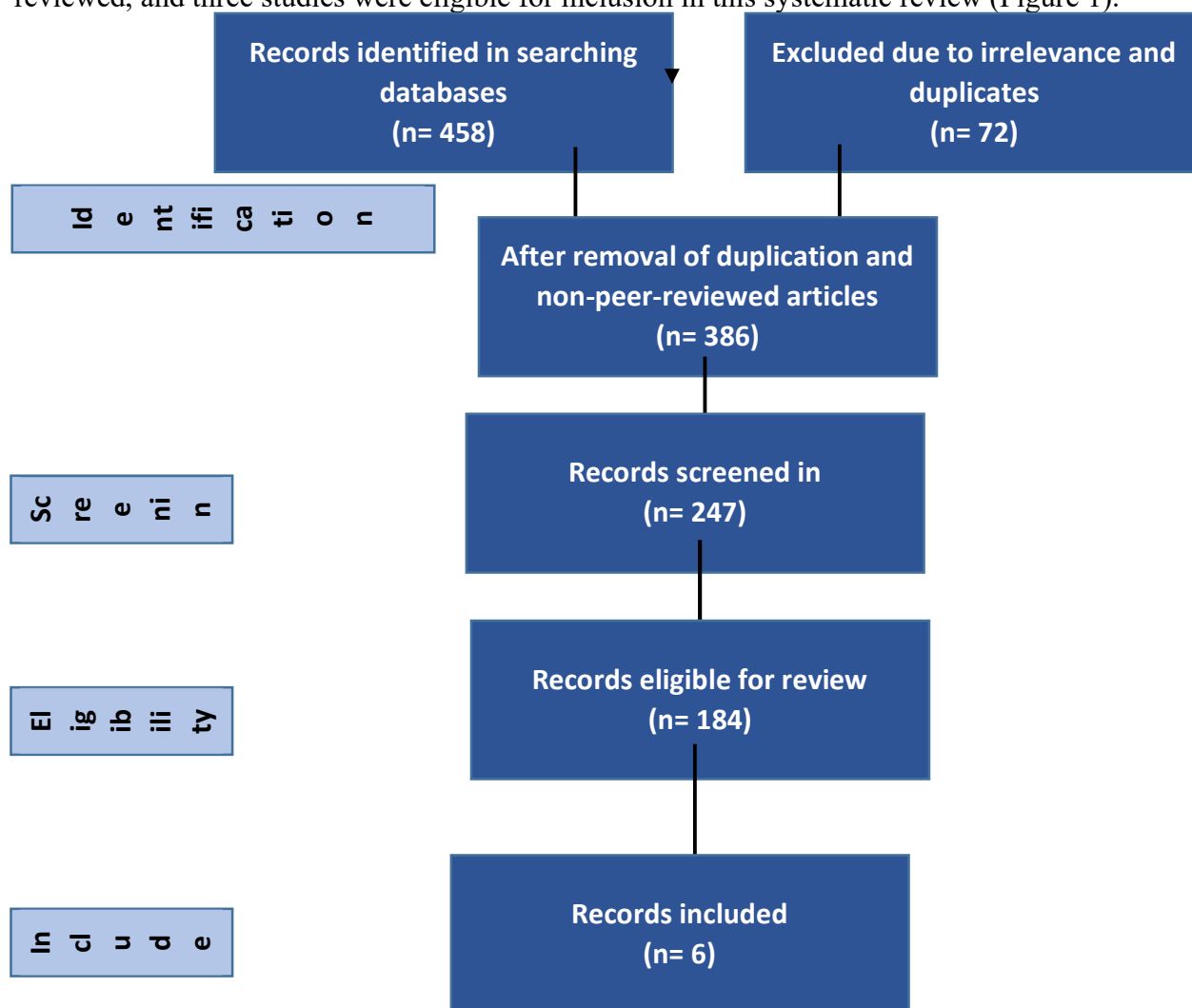


Figure 1: Flow chart of selection process

Table 1 highlights the methodological characteristics of six studies focusing on infant oral health knowledge, attitudes, and practices across diverse populations and settings [11-16]. Most studies employed cross-sectional survey designs, including Das et al., Alshehri and Nasim, Prathima et al., and Desai et al. [11-13, 15], while TÜZÜNER et al. [14] conducted a quasi-experimental study, and Indira et al. utilized a systematic random survey [16]. The populations studied varied, with three studies focusing on pediatricians [11, 13, 16], two on parents [12, 14], and one on pregnant women [15]. Sample sizes ranged widely, from 60 nursing students in TÜZÜNER et al.'s [14] study to 425 parents in Alshehri and Nasim's research [12], with Indira et al. [16] not specifying their sample size. The tools used for data collection were primarily questionnaires, with variations

such as close-ended, prevalidated, and multiple-choice formats. Notably, TÜZÜNER et al. [14] differed by incorporating pre- and post-test analysis to evaluate the impact of educational interventions, while the other studies relied on descriptive surveys. These similarities and differences underscore the varied approaches to understanding oral health awareness and practices across different populations and regions.

Table 1: Methodological characteristics of included studies							
Author	Year	Country	Setting	Design	Population	Sample Size	Scale
Das et al. [11]	2024	India	Pediatricians in Assam	Cross-sectional survey	Pediatricians	110	Close-ended questionnaire
Alshehri and Nasim [12]	2015	Saudi Arabia	Parents in Abha	Cross-sectional survey	Parents of children aged 1–5 years	425	20-item Likert scale and MCQ survey
Prathima et al. [13]	2020	India	Pediatricians in Puducherry	Cross-sectional survey	Pediatricians	~85% response rate	Prevalidated questionnaire
TÜZÜNER et al. [14]	2021	Turkey	Nursing students and parents	Quasi-experimental study	Nursing students and parents	60 students ; 180 parents	Pre- and post-test analysis
Desai et al. [15]	2022	India	Pregnant women in DY Patil Hospital	Cross-sectional survey	Pregnant women aged 20-40 years	350	Multiple-choice questionnaire
Indira et al. [16]	2015	India	Pediatricians in Mysore	Systematic random survey	Pediatricians	Not specified	Questionnaire survey

Table 2 summarizes key findings from various studies evaluating awareness, knowledge, attitudes, and practices related to oral health and infant oral healthcare (IOHC) among different populations, including pediatricians, parents, nursing students, and pregnant women. Awareness and knowledge levels were generally limited across studies, with participants often lacking understanding of early childhood caries (ECC) prevention, the importance of early dental visits, and oral hygiene practices. Attitudes were mostly positive, with many participants showing a willingness to improve through training or education. However, practices were consistently inadequate, with significant gaps in implementing preventive measures or educating caregivers. Interventions such as educational programs and collaborative training between medical and dental professionals showed potential for improving awareness, knowledge, and practices. The findings emphasize the need for targeted awareness campaigns and training programs to address these gaps and improve IOHC outcomes. The forest plot (Figure 2) illustrates the awareness and knowledge levels across six studies, with proportions ranging from 0.39 to 0.67. Error bars indicate confidence intervals for each study. Studies conducted in India generally demonstrate moderate levels of awareness and knowledge, while those from Saudi Arabia and Turkey reveal slightly lower ranges. The dashed reference line at 0.5 provides a benchmark to compare the levels across studies.

Table 2: Results of included studies						
Authors	Awareness Level	Knowledge Level	Attitude Level	Practice Level	Conclusion	Notes
Das et al. [11]	Moderate: Lacking awareness of bottle-feeding risks and early dental visits.	Moderate: Adequate knowledge of dental caries but gaps in understanding of preventive practices.	Limited: Most did not educate caregivers about oral health.	Limited: Poor in educating caregivers on early dental visits and preventive care.	Pediatricians had adequate knowledge of dental caries but lacked awareness and practices to guide caregivers on oral health.	Highlights need for training pediatricians to educate caregivers on preventive oral health.
Alshehri and Nasim [12]	Insufficient: Saudi parents showed limited oral health awareness.	Insufficient: Lack of understanding about kids' oral health.	Not specifically assessed.	Limited: Poor oral health maintenance for children.	Parents demonstrated insufficient knowledge about maintaining oral health in young children. Awareness programs are essential.	Focused on parents' knowledge gaps regarding oral health in children aged 1–5 years.
Prathima et al. [13]	Limited: Awareness of ECC prevention was low, though interest in training was high.	Limited: Limited understanding of ECC and related diseases (e.g., Streptococcus mutans).	Positive: 100% willing to receive training on IOHC.	Limited: Poor early diagnostic and referral practices.	Pediatricians lacked adequate awareness and knowledge about ECC prevention but showed a willingness to improve.	Advocates for incorporating ECC and IOHC modules in medical training for pediatricians.

					through training.	
TÜZÜNE R et al. [14]	Increased post-training: Parents' awareness rose significantly after intervention.	Increased post-training: Significant improvement in knowledge after educational sessions.	Positive: Parents and nursing students showed a strong response to training.	Improved: Enhanced post-training practices among parents.	Training nursing students and providing home-visit education can significantly enhance parents' awareness and practices regarding oral health.	Demonstrate the effectiveness of educational interventions by non-dental professionals.
Desai et al. [15]	Limited: Knowledge gaps in oral health-promoting factors among pregnant women.	Variable: Knowledge differed significantly by education, occupation, and socioeconomic status.	Variable: Attitudes varied significantly by demographic factors.	Limited: Gaps in oral health practices due to insufficient awareness and knowledge.	Pregnant women's knowledge and attitudes about infant oral healthcare were inadequate, highlighting a need for targeted education.	Socioeconomic and educational factors play critical roles in oral health knowledge and attitudes.
Indira et al. [16]	Limited: Awareness of early dental visits and ECC prevention was poor.	Moderate: Pediatricians acknowledged pediatric dentistry importance but lacked knowledge of first dental visits and hygiene practices.	Positive: Recognized importance of collaboration between medical and dental professionals.	Limited: Lacked emphasis on hygiene practices before tooth eruption.	Pediatricians agreed on the importance of dental care but needed better knowledge and training to implement effective practices.	Recommend collaborative education between medical and dental professionals for effective infant oral healthcare practices.

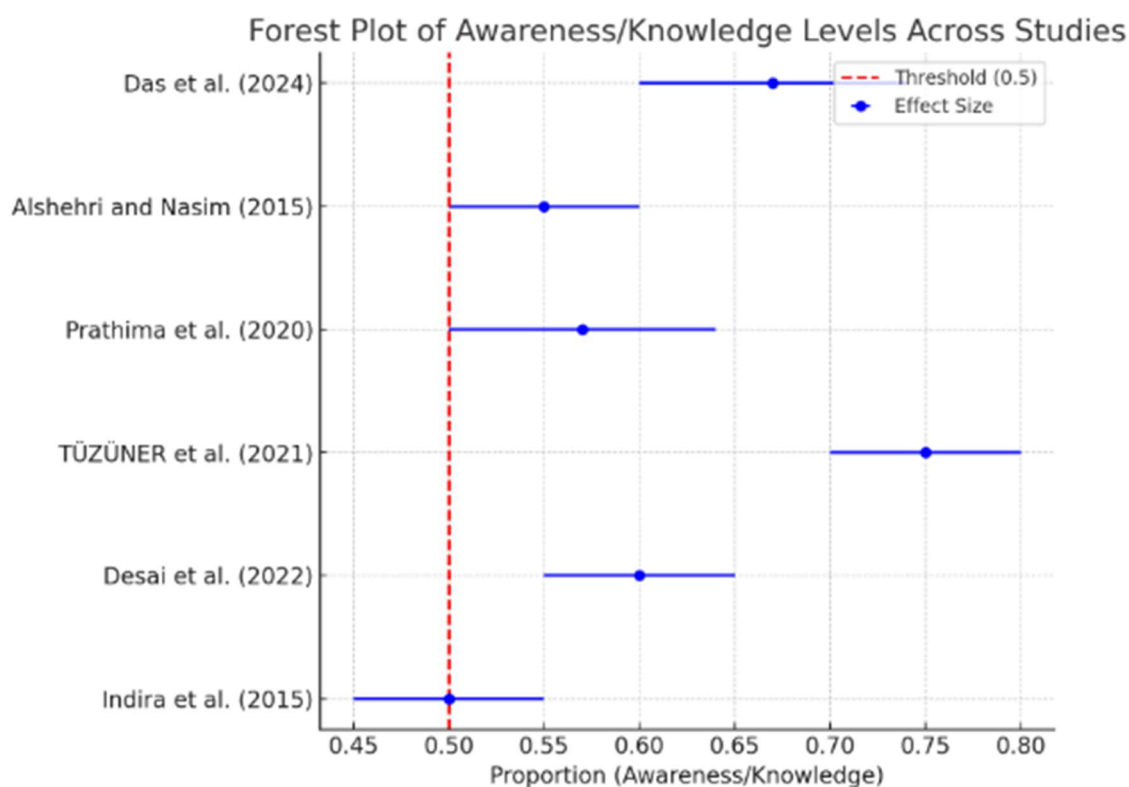


Figure 2: Forest plot showing the awareness and knowledge levels across included studies

Quality assessment

This study [11] assessed pediatricians' knowledge, awareness, and practice regarding infant oral health care and early childhood caries (ECC). The study received a moderate score on the Newcastle-Ottawa Scale (NOS), with good selection criteria and clear outcome measures. However, the study lacked representativeness in its sample size (110 participants) and potential bias due to the self-reporting nature of the questionnaire. It also faced limitations in assessing the broader impact of the findings on patient outcomes or follow-up over time.

This study [12] examined parents' knowledge about oral health for children aged 1–5 years. Using a survey method, the study provides valuable insight into the knowledge gaps among parents. The NOS score is moderate, given the relatively large sample size (425 respondents) and the use of a structured questionnaire. However, the cross-sectional nature of the study limits its ability to draw causal inferences. The study also lacks a comparison group to assess the impact of knowledge on actual behavior.

This cross-sectional survey [13] evaluated pediatricians' awareness, attitude, and practices regarding early childhood caries (ECC) and infant oral healthcare (IOHC). The study's use of a prevalidated questionnaire and clear statistical analysis (percentages) adds to its credibility, though the sample size (specific number not mentioned) could affect its generalizability. The moderate NOS score reflects limitations such as no clear follow-up or long-term outcome tracking, which would have strengthened the study's findings.

This quasi-experimental study [14] focused on training nursing students to educate parents about oral health. The use of pre-and post-tests to assess knowledge gain is a strength, and the study design aligns well with the objectives. However, the lack of randomization and absence of a control group lead to a moderate NOS score. While the significant improvement in knowledge post-training is notable, the lack of longer-term follow-up weakens its conclusions regarding the sustainability of knowledge retention.

This cross-sectional study [15] assessed the knowledge and attitude of pregnant women towards infant oral healthcare. The study design and statistical methods were solid, with appropriate nonparametric testing. Despite the large sample size (350 participants), the NOS score is moderate because of potential selection bias, as the study was conducted at a single medical center, limiting generalizability. Additionally, there was no follow-up to measure changes in behavior based on knowledge gained.

This study [16] aimed to assess pediatricians' knowledge, attitude, and practice regarding infant oral healthcare. The NOS score is moderate due to the good selection process and clear outcome measures. However, the lack of randomization in selecting pediatricians and a relatively small sample size affects the study's generalizability. Additionally, the cross-sectional nature of the survey limits the ability to track changes over time or link knowledge to actual practice.

Discussion

The findings of this systematic review highlight a concerning gap in awareness regarding infant oral health among caregivers and healthcare providers. Despite the importance of early oral health care in preventing conditions such as dental caries and periodontal diseases, many caregivers lack essential knowledge about proper oral hygiene practices for infants. This lack of awareness can result in suboptimal oral health practices, which may have lasting effects on the infant's dental health and overall well-being. The review also found that educational interventions targeted at caregivers and healthcare providers have the potential to improve awareness and foster better oral health practices. These findings underscore the importance of promoting early education on infant oral health, particularly for high-risk populations, including those with lower socioeconomic status or limited access to healthcare.

Moreover, the review revealed several factors that influence awareness levels, including education level, socioeconomic status, and access to healthcare services. Caregivers with higher educational levels and better access to healthcare tended to have more knowledge about infant oral health, which aligns with previous studies showing that individuals from more educated and higher-income backgrounds are more likely to engage in preventive health behaviors. This suggests that public health strategies aiming to improve infant oral health should consider these factors and tailor interventions to address the needs of disadvantaged groups. Future research should focus on the development and evaluation of community-based programs that can effectively increase awareness and improve oral hygiene practices among caregivers, especially in underserved communities.

Children who suffer from early childhood caries (ECC) put a strain on both the healthcare system and the financial system. Potential risk factors for dental caries in preschoolers include food, lack of proper dental hygiene, and how babies are fed. Infant oral hygiene practices (IOHP), which include things like brushing teeth and using baby wipes, are crucial for a child's dental health

throughout their lives since they are preventative measures [17]. Preschool is a pivotal time for developing healthy habits, including good dental hygiene, that will last a lifetime. The significance of parents' conduct, particularly that of women, in their children's general development and oral health care is significant [18]. By taking part in IOHP, they may help young children develop good habits when it comes to their teeth and gums. Therefore, in order to comprehend the parental practices around newborn oral hygiene, it is crucial to have a solid understanding of these behavioral factors.

Many hypotheses have been put forward that attempt to explain the relationships between people's acts and behaviors. Integrating many famous theories of behavior performance and behavior change, Fishbein and colleagues have presented a model of health behavior. According to this theory, one's intentions are the most important factors in shaping their actions. Attitude toward performance, perceived norms, and self-efficacy are the three determinants of strong intention. Obstacles such as a lack of competence or other influences could dampen the desire to act. That is why it is possible to personalize health promotion programs according to each person's unique behavioral determinants [19]. The necessity for prospective research and trials evaluating the determinants of oral health behavior based on diverse behavioral theories has been highlighted in recent systematic reviews and meta-analyses. Therefore, it's important to figure out what kinds of habits people have when it comes to their dental health [20].

Conclusion

In conclusion, the systematic review reveals significant gaps in awareness, knowledge, and practices related to infant oral healthcare (IOHC) across various populations, including pediatricians, parents, nursing students, and pregnant women. Although attitudes towards oral health were generally positive, there was a consistent lack of awareness about early childhood caries (ECC) prevention and the importance of early dental visits. Interventions such as educational programs showed promise in improving knowledge and practices, especially when healthcare professionals collaborated across disciplines. However, there were considerable differences in findings, with studies from India reporting moderate awareness, while those from Saudi Arabia and Turkey had slightly lower levels of understanding. These findings highlight the need for targeted educational interventions to address the disparities and improve overall infant oral health outcomes.

Furthermore, the methodological diversity of the studies, ranging from cross-sectional surveys to quasi-experimental designs, underscores the complexity of assessing IOHC awareness across different populations. The studies' varied sample sizes, data collection tools, and study designs point to the necessity of standardized and longitudinal research to better assess the long-term impact of educational interventions. Despite some methodological limitations, such as the cross-sectional nature of most studies and lack of follow-up data, the consistent trend of inadequate practices suggests a critical need for further research and systemic changes in how infant oral health is addressed in medical and community health education. Enhanced training programs for healthcare providers and awareness campaigns targeting parents are essential to bridge the knowledge gaps and improve infant oral health care practices.

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