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Research Article

"Barriers, facilitators, scope, and feasibility of integrating oral health into school health programs: A qualitative study in Bengaluru, India"

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Introduction

Oral health promotion within school-based health programs is essential for enhancing children's overall health [1]. Oral health and hygiene maintenance play a significant role in children's learning, communication, and daily activities, yet remain inadequately integrated into school health programs [2, 3]. Dental issues can impede academic achievement, school attendance, and performance due to pain and difficulties in eating and communication, which negatively impact concentration and educational outcomes [4, 5]. Schools, where children spend a considerable portion of their time, provide an ideal setting for promoting comprehensive health practices, including oral health [6, 7]. This paper aims to critically examine the existing challenges and opportunities for enhancing the oral health of school-aged children in Bengaluru, India [8].

Integrating oral health into school curricula is feasible and can provide long-term health benefits, such as improved health outcomes, reduced future healthcare expenditures, and the development of lifelong healthy habits [9, 10]. Insights gained from this integration would be valuable for policymakers and educators in urban settings like Bengaluru [11]. While school health programs commonly focus on physical activity, nutrition, and mental health, oral health is frequently overlooked [12, 13]. School-based interventions have the potential to significantly reduce dental issues and improve hygiene, but challenges remain, including limited resources and insufficient training for educators [14, 15]. Additionally, there is limited qualitative research on these barriers, particularly from resource-limited settings [16].

This protocol outlines a study designed to identify barriers and facilitators for implementing school-based oral health programs in Bengaluru through qualitative methods, specifically in-depth interviews. The goal is to uncover challenges and effective strategies for integration by gathering insights from educational stakeholders in Bengaluru to better understand the factors influencing the integration of oral health in schools, thereby addressing research gaps and guiding improvements in policy and practice [17, 18]. The findings will offer recommendations to strengthen school health programs in low-resource settings as well as for being adapted for similar urban contexts globally [24].

Aim: This study aims to explore the barriers, facilitators, scope, and feasibility of integrating oral health into school health programs in Bengaluru, India.

Research Questions:

1. **Barriers**: What are the key barriers faced by schools in Bengaluru when integrating oral health into existing school health programs?
2. **Facilitators**: What are the main facilitators that support the integration of oral health into school health programs in Bengaluru?

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3. **Scope**: What is the scope for integrating oral health initiatives into existing school health programs in Bengaluru, considering the existing health infrastructure, and school policies?
4. **Feasibility**: How feasible is the integration of oral health into school health programs in Bengaluru, considering the availability of resources, trained personnel, and community engagement?

Methodology

Study Design:
This study will use a qualitative design with in-depth interviews. The interviews will be guided by a theoretical framework to gain an understanding of the barriers and facilitators for integrating oral health into school health programs in Bengaluru, India. This framework ensures a systematic approach to exploring the complexities involved in this integration process [25].

Participants Selection:
A purposive sampling method will be employed to select participants based on their expertise and experience with school health programs and oral health services. This method will ensure a targeted selection of information-rich cases that contribute to in-depth insights [26].

Non-Participation:
Instances of non-participation, such as refusals or dropouts, will be recorded, with reasons documented as provided by participants. This approach will maintain transparency and provide context for any attrition in the study [27].

Method of Approach:
Face-to-face, in-depth interviews will be conducted with the selected stakeholders. This approach allows for rich, detailed data collection, enhancing the understanding of each participant's unique perspectives and experiences [28].

Source of Data:
The data sources will include a range of stakeholders with varying expertise, including heads of schools, school teachers, dental faculty, and specialists from public health and pediatrics, ensuring a broad spectrum of perspectives [29].

Sample Size:
A total of 15-28 in-depth interviews are anticipated, aiming for data saturation, which will be determined when no new themes or insights emerge, ensuring data adequacy [30].

The setting of Data Collection:
Data collection will occur across multiple schools in Bengaluru, providing a diverse and representative sample that reflects the perspectives of various stakeholders in different school environments [31].

Inclusion Criteria:
- School teachers and heads with at least 1-2 years of experience in their respective institutions [32].
- Dental staff with at least 1-2 years of experience in public health dentistry or pedodontics [33].
- Medical staff from pediatrics with at least 1-2 years of experience [34].
- Subject experts in public health dentistry or pediatric dentistry holding a master's degree and a minimum of 5 years of experience in the field [35].

Exclusion criteria:
- Part-time teachers from schools or dental colleges.
- Parents of day scholars in schools [36].

Table 1: Heterogeneous Combination of School Stakeholders for In-Depth Interviews

Stakeholder Category	Key Informants for In-Depth Interview	Examples of Stakeholders to Include	Expected Range of Numbers for Interview
School Teachers/Heads	School administration and teaching staff	Teachers, Principals, Health Coordinators	7 to 10
Dental Professionals	Oral health service providers	Dentists, Dental Hygienists, Community Dental Workers	5 to 8
NGO Representatives	Representatives from health-focused NGOs	NGO Project Managers, Health Program Officers	2 to 5

RBSK Representatives	Child health program personnel	RBSK Program Coordinators, Health Officers	1 to 2
Block Education Officers (BEOs)	District-level education administration	BEOs, Health Education Supervisors	2 to 3
Total			**Up to 28**

Methodology for In-depth Interviews

- **Interview Guide Development:**

A structured interview guide will be developed specifically for in-depth interviews to explore stakeholders' perspectives on barriers and facilitators to oral health integration in schools. The interview guide will comprehensively cover eight domains, tailored to address each stakeholder group [37].

Components of Interview Guide:

1. Challenges to the Integration of Oral Health
1.1 What are the significant challenges your school faces in delivering oral health services or integrating oral health education?
1.2 To what extent have resource constraints, including funding and materials, constrained the integration of oral health into existing programs at your school?
1.3 Do policies or legal provisions hinder the integration of oral health into the health programs offered at your school? To what extent?
2. Oral Health Enablers Implementation
2.1 What do you think have been some of the resource or initiatives that are supporting your school in promoting oral health among students till date?
2.2 Have there been any successful initiatives or collaborations that have helped in bringing forth oral health promotion in your school?
3. Oral Health Implementation Potential
3.1 How do you envision the fit of oral health into the current health programs or services offered by your school?
3.2 What do you think nutrition, physical environment, or existing health education programs contribute to oral health in school?
4. Feasibility of Integration
4.1 What kind of support (e.g. training of staff, funding, partnerships) would make oral health programs easier to be integrated in your school?
4.2 How prepared is your school staff for the oral health program? Do you think there is specific training that could facilitate this integration?
4.3 How would you assess the community's involvement in favor of oral health programs at your school? Are there partnership opportunities that can be friendly?

The interview guide will include the following domains:

1. **School Health Services:** Examining existing oral health services and potential improvements
2. **School Health Education:** Exploring attitudes toward oral health education and current programs
3. **Nutrition and Food Services:** Assessing the role of nutrition in oral health promotion
4. **Health Promotion for School Staff:** Identifying staff roles and training needs in oral health
5. **Healthy School Environment:** Investigating physical factors that impact oral health within school settings
6. **Relationship and Collaboration with the Community:** Exploring partnerships with external organizations
7. **Mental Health and Well-being:** Analysing the psychological impact of oral health on students
8. **Physical and Leisure Activities:** Discussing how physical activity contributes to oral health

Pilot Testing and Data Collection:

The interview guide will undergo pilot testing to ensure clarity and relevance. Data collection will involve audio recordings supplemented by field notes. Each interview is expected to last 60-90 minutes, and repeat interviews will be conducted if necessary to confirm data saturation, which will be evaluated iteratively [38].

Data Analysis and Reporting:

Data Analysis

We will categorize and analyze participant definitions, experiences, and practices systematically, focusing on oral health integration in school health activities. All data relevant to each analytical category will be reviewed to ensure consistency and completeness, following the thematic analysis guidelines proposed by Braun and Clarke [39]. Key steps will include (1) transcription and rigorous verification of transcripts against recordings

to ensure accuracy; (2) independent open coding of interview responses by two researchers to identify initial insights; (3) collaborative discussions to refine and reach agreement on initial codes, establishing a preliminary codebook; (4) iterative application of the coding structure to the remaining responses, allowing for the incorporation of new codes as they emerge; and (5) synthesis of themes and subthemes based on the finalized coding framework, presenting their interrelationships [39].
The coding framework will initially draw on categories outlined in a preceding scoping review, aligning interview structures with these categories. From this foundation, new analytic categories and themes will be inductively developed from participant data, enabling a combined deductive and inductive approach. To ensure trustworthiness throughout the thematic analysis, we will systematically archive raw data, document detailed notes on theme evolution, establish consensus among researchers on themes, and provide thorough context descriptions. We will use Atlas Ti. Web Version Software for data management and analysis, allowing for efficient data storage, retrieval, and categorization [39].

Ensuring Study Quality

To enhance study rigor, Guba and Lincoln's framework for quality in qualitative research will be utilized, encompassing the principles of credibility, transferability, dependability, confirmability, audit trails, and reflexivity [40]. We will ensure credibility by employing peer debriefing, wherein the lead researcher (LN) will consult with a senior researcher (DH) for expert feedback, enhancing the study's validity. Transferability will be promoted by richly describing stakeholder contexts to facilitate the application of findings in similar settings. Dependability will be addressed through a well-defined research protocol guiding the study and aiding future similar investigations. Confirmability will be reinforced by transparent documentation of methodological choices, ensuring that interpretations derive directly from data rather than researcher assumptions, while audit trails will be meticulously maintained to document each research decision. Lastly, reflexivity will be integral to our process, with researchers maintaining transparency by recording and examining personal assumptions, values, and potential biases, ensuring clear and thorough documentation throughout the study [41].

Discussion:

This prospective study will provide vital insights into the perspectives of school stakeholders in the Bengaluru urban context regarding the integration of oral health into school health activities, guided by the Health Promoting Schools (HPS) framework. Building upon a scoping review that highlighted significant gaps in how health programs are implemented in school settings, this study will address the specific challenges and needs faced by Bengaluru's urban schools in adopting consistent oral health practices. The initial review underscored variability in health initiatives, with oral health often underemphasized compared to general health programs. By engaging with diverse stakeholders—teachers, administrators, health coordinators, and external partners such as Block Education Officers (BEOs) and NGO representatives—this study will gather comprehensive data on how oral health is viewed, prioritized, and potentially integrated into the health frameworks of urban Bengaluru schools [40-43].
In the Bengaluru context, we anticipate that school-based stakeholders will identify both opportunities and obstacles unique to urban environments, including disparities in resource allocation, training for school staff, and support from health professionals. While teachers and administrators are expected to provide perspectives on the daily challenges of implementing health activities amidst academic pressures, dental professionals and NGO representatives may contribute valuable insights into how community-based resources could support sustained oral health initiatives within schools. Block Education Officers (BEOs) are anticipated to offer a policy-driven viewpoint on implementing oral health as part of a broader health curriculum, providing insights into district-level support structures and budgetary constraints. Collectively, these perspectives will help clarify the practicalities of adopting a standardized, reproducible framework to address oral health needs in Bengaluru's diverse school ecosystem [44].
A potential limitation of this study lies in the exclusion of parents and students, whose perspectives might provide additional depth on the acceptability and perceived value of oral health programs [45, 46]. Nevertheless, this study's strength is its direct engagement with school-related stakeholders, enabling a clearer view of the motivations, barriers, and support required to implement effective oral health activities. By focusing on Bengaluru's urban school environment, this study will contribute not only to the local implementation of health promotion but will also offer scalable insights that could benefit similar urban educational settings. The findings are expected to advance understanding of practical challenges and opportunities in urban school health promotion, helping policymakers and educators design evidence-based frameworks for comprehensive health integration, including oral health, within urban school settings [47].

Ethics and Dissemination

Informed consent will be obtained following the requirements of the Ramaiah University of Applied Sciences Ethics Committee. Written consent will be required from participants for all in-person interviews to ensure full understanding and agreement to participate. Participant confidentiality and data protection will be maintained according to university guidelines, with all identifying information anonymized. Hard-copy data, including

signed consent forms, will be securely stored in a locked unit, while electronic data will be stored in password-protected files accessible only to authorized research personnel. Upon completion of the study and publication of results, all study materials will be retained and disposed of in compliance with Ramaiah University regulations. The findings of this study will be disseminated widely to maximize impact and application. Results will be presented at relevant academic conferences and stakeholder meetings, and findings will be published in a peer-reviewed journal. Additionally, the results will be included in the doctoral thesis of the PhD candidate leading the study (ARS) and shared through articles in professional and general-interest magazines. Practical insights and good practice examples will also be communicated via workshops at professional gatherings and shared as accessible online materials to reach a broad audience of school stakeholders and public health professionals.

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