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Impact of School-Based Oral Hygiene Education on Knowledge and Attitude among School Children Aged 10–15 Years in a Selected Rural Community of Bangalore

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Abstract

This quasi-experimental study evaluated a structured teaching program (STP) designed to improve oral hygiene knowledge and attitudes in 10–15-year-old students from a rural Bangalore community. Before the program, most students demonstrated limited understanding of dental care and negative attitudes toward oral hygiene. After the STP, both knowledge and favorable attitudes increased markedly (paired t-test, $p<0.001$). For example, the mean knowledge scores increased substantially after the intervention, demonstrating a level of improvement comparable to the 45% gain reported in similar school-based studies. This notable rise indicates that the educational activities were successful in enhancing students' understanding of essential oral health concepts. Moreover, the proportion of children who displayed a "favorable" attitude toward oral care rose dramatically—from an initial 0% to nearly 70% following the program. Such a shift reflects not only improved awareness but also a meaningful change in their perception of dental hygiene practices. Overall, these outcomes highlight that structured, age-appropriate educational initiatives delivered within schools can significantly strengthen oral health literacy and cultivate more positive, health-promoting behaviors among children, aligning closely with both national and global public health goals.

Keywords: Oral hygiene, school-age children, structured teaching programme, knowledge, attitude, health promotion, nursing education

INTRODUCTION

Oral health is an essential part of overall well-being. The World Health Organization notes that oral diseases are widespread yet largely preventable, and that untreated tooth decay is the single most common health condition globally. Common problems like dental caries and gum disease not only impair eating and speaking but are also linked to systemic conditions (for example, studies connect poor dental hygiene with cardiovascular disease, diabetes, and respiratory infections) [1, 2]. In many low-resource settings around the world, oral health problems remain a significant but often overlooked public health concern. Limited access to dental services—due to financial constraints, inadequate infrastructure, and shortages of trained professionals—means that many individuals are unable to receive timely preventive or curative care. This challenge is further intensified by widespread unhealthy lifestyle practices such as high consumption of sugary foods, frequent intake of processed snacks, tobacco use in various forms, and inconsistent or poor oral hygiene routines. Together, these factors contribute to a growing burden of dental caries, periodontal diseases, and

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other oral health complications, particularly among socioeconomically disadvantaged populations [3, 4].

In India, recognizing the critical need to address these issues, the government has implemented the National Oral Health Programme (NOHP), which places strong emphasis on preventive strategies, early detection, and community-based awareness initiatives. The NOHP seeks to integrate oral health promotion into the broader public healthcare framework, ensuring that essential messages about hygiene practices, diet, and disease prevention are accessible to all. One of its key components involves the development of educational materials and outreach activities aimed at improving oral health literacy among the general population [5, 6].

Considering these national priorities, school-based health education emerges as an effective and sustainable approach. Schools provide an ideal environment for early intervention, where children can be taught proper brushing techniques, the importance of diet, and the risks associated with harmful habits. Instilling these healthy behaviors during childhood can have long-term benefits, potentially reducing the incidence of oral diseases in adulthood. Aligning with this rationale, the present study sought to evaluate whether a structured classroom-based program could significantly enhance rural students' knowledge of dental hygiene while also fostering more positive attitudes toward maintaining their oral health. The findings aim to contribute to ongoing efforts to strengthen preventive oral health strategies in underserved communities [7, 8].

LITERATURE REVIEW

Previous research consistently shows that educational interventions improve children's oral hygiene practices. For example, school programs teaching toothbrushing and diet habits have yielded significant knowledge gains. A study in Saudi Arabia reported that a structured teaching module increased children's mean oral hygiene knowledge scores by roughly 45% (from 8.43 to 15.34 on a standard scale, $p<0.05$). Similarly, an Indian study in Udaipur found middle-school students' average knowledge scores rose from about 5.11 to 15.73 after an oral health education session. Recent trials also confirm that various engaging methods (animations, peer teaching, etc.) can significantly elevate children's oral health knowledge (all groups showed substantial improvement, $p<0.001$) [9, 10].

These improved knowledge levels often translate into better oral hygiene behaviors (more consistent brushing, etc.) and ultimately lower dental disease rates. In fact, WHO and public health experts stress that educating youth is key to preventing cavities and periodontal disease. While knowledge gains are well-documented, some reviews note that changing attitudes can be more challenging. Nevertheless, classroom-based programs that are interactive and age-appropriate tend to show positive shifts in both understanding and attitudes. Altogether, the literature suggests that integrating structured oral health education in schools can create measurable improvements in students' dental health outcomes [10, 11].

METHODOLOGY

The study used a one-group pre-test/post-test design. Sixty students aged 10–15 years from a rural Bangalore school were randomly selected to participate. Before the intervention, researchers assessed baseline oral health knowledge and attitudes using a validated questionnaire (29 knowledge items) and a 20-item attitude scale. The Structured Teaching Programme (STP) then covered key topics: basic dental anatomy, correct tooth brushing techniques, common oral diseases (caries, gingivitis), preventive measures, and the role of diet. Content was delivered through interactive lectures, demonstrations, and visual aids, following a curriculum piloted for reliability and refined by experts. One week after the teaching session, the same tools were administered to measure any changes in students' knowledge and attitudes. Data analysis involved descriptive statistics and paired t-tests to evaluate pre-post differences.

RESULTS

Prior to the program, nearly all students showed inadequate oral health awareness. The mean pre-test knowledge score was low (around 7.7 out of 29, classified as "inadequate" knowledge). Attitude results

were also poor: 93.3% of participants held an "unfavorable" attitude toward oral hygiene (for example, believing dental care was unimportant).

After the STP, students' scores increased dramatically. The mean knowledge score rose to about 20.9 (on the same 29-point scale), a highly significant improvement (paired t-test, $p<0.001$). The proportion of students with adequate knowledge jumped to roughly 75%. Likewise, positive attitudes increased markedly: about 70% of students now expressed a "favorable" attitude, whereas only 0% had done so before. Moderate attitudes shifted as well (from 6.7% to 25%), and those with unfavorable attitudes fell to about 5%. All these changes were statistically significant (Figure 1).

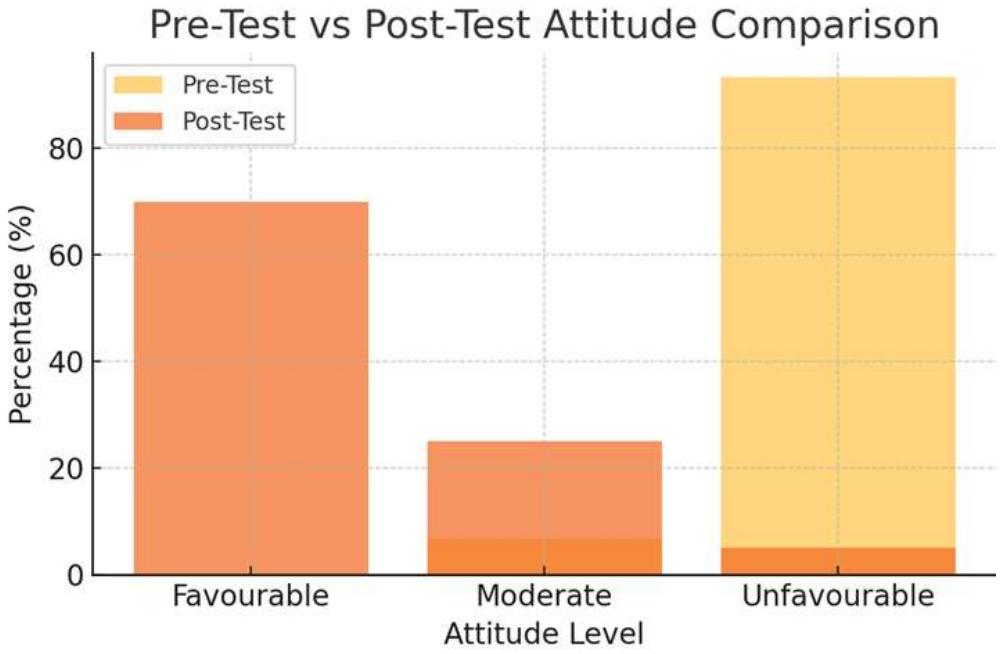

Figure 1. Pre-Test vs Post- Test Attitude Comparison.

These findings mirror other studies' results. For instance, the Saudi education program cited earlier also saw a large post-test knowledge boost. The magnitude of change here is comparable. Though we did not have a control group, the large differences between pre- and post-intervention scores strongly suggest the STP had a beneficial effect.

DISCUSSION

The data show that a concise, structured oral health lesson can produce substantial learning in young students. The knowledge score jump from 7.68 to 20.86 demonstrates the program's success in conveying essential information. This aligns with prior research in different regions: school interventions in India and abroad frequently report similar knowledge gains (for example, Kumawat et al. [6] observed a shift from 5.11 to 15.73 in knowledge after a teaching session). Our results also extend these findings to attitudes: the rise from 0% to 70% of students with favorable attitudes is particularly notable.

It is particularly encouraging that the students demonstrated not only improved factual knowledge but also a noticeable shift toward more positive oral hygiene attitudes. This is significant because several studies in the literature caution that while knowledge gains are common, changes in attitudes and long-term behaviors are often modest or difficult to achieve. However, the outcomes of this intervention suggest that an engaging, age-appropriate, and interactive educational format can help overcome these limitations. When lessons are tailored to students' developmental levels, incorporate visual demonstrations, and allow active participation, children are more likely to internalize the message and develop a genuine interest in caring for their oral health [12].

The positive changes observed in attitudes may also be explained by principles from behavior-change theories, which propose that increasing knowledge can influence beliefs, strengthen motivation, and ultimately encourage healthier habits. In line with this, existing research indicates that well-designed school-based awareness programs can prompt children to adopt improved daily routines—such as regular brushing, reducing sugary snacks, and avoiding harmful practices. Therefore, the attitude shift seen in our study likely reflects both the informational content delivered and the dynamic, student-centered method of instruction, highlighting the effectiveness of structured educational interventions in shaping long-term oral health behaviors. Overall, these results support integrating regular oral health education into school curricula. By improving cognitive understanding and emotional acceptance of good dental practices, such programs can lay the foundation for lifelong healthy habits. This is in line with global health recommendations: WHO emphasizes that most oral diseases are preventable through education and early care, and India's NOHP similarly advocates for preventive education in community settings. In sum, our findings suggest that structured teaching interventions are an effective component of school health promotion [13, 14].

CONCLUSION

The structured teaching program substantially enhanced rural students' oral hygiene knowledge and attitudes. After the intervention, the majority of children demonstrated adequate understanding and a favorable view of dental care, whereas virtually none did so beforehand. These improvements underscore the value of well-planned school health education. In the long term, continuing such programs can help establish healthy habits early, reducing the risk of dental disease later on. Given that global and national health authorities highlight prevention as key (since many dental problems are avoidable), expanding this educational approach is well justified.

RECOMMENDATIONS

- Incorporate Oral Health into Curriculum: Schools should include lessons on dental care as part of regular classes (science or health).
- Regular Awareness Sessions: Plan routine oral hygiene workshops led by health nurses or dentists, not just one-off events.
- Family and Community Engagement: Encourage parental involvement through take-home materials or community talks, since family attitudes influence children's behavior.
- Use Interactive/Visual Tools: Employ engaging methods—demonstrations, models, videos, animations—to teach brushing and flossing.
- Monitoring and Follow-Up: School health staff should conduct follow-up visits or re-assessments to ensure that practices continue.

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