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Original Research Article

Effectiveness of various sensory input methods in dental health education among visually impaired children of age group between 3-14 years- A comparative study

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Abstract

Introduction: Oral health education is essential for all, but it poses unique challenges for visually impaired children who rely on senses other than sight to learn. Customizing educational methods using sensory inputs like touch and sound can significantly enhance their understanding and practice of oral hygiene. This study aims to evaluate the effectiveness of various sensory input methods in improving oral health awareness among visually impaired children.
Aim & Objectives: The objective of the research is to assess the success of different sensory input techniques in oral training program for visually impaired child. The dental health condition was evaluated by measuring plaque scores both prior to and following the oral health education.
Materials and Methods: The research included 50 child with low vision aged between 3 and 14 years, representing both genders, from a single institution for the blind. The overall study population (n=50) was randomized and separated into two groups, each consisting of 25 children.
Results: Following the intervention, the average scores exhibited statistical significance in both study groups when contrasted with the baseline scores.
Conclusion: The research indicates that visually impaired children can achieve a satisfactory level of oral hygiene when instructed using specialized, tailored methods such as a multisensory approach, which has proven to be more effective than a unisensory method.

Keywords: Health education, Oral Health, Oral hygiene

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1. Introduction

Dental care is a crucial aspect of overall, influencing not only aesthetics and interaction but also having significant physical emotional, and social implications. Nation like India, where health awareness is generally low and poor oral hygiene is widespread, along with limited access to oral health professionals, providing comprehensive treatment for the entire community seems impractical. Consequently, there is a clear necessity to explore the success of promoting oral health through dental training.[1]

Wellness promotion concerning the sustainability of good oral health is vital for all individuals, including those with special need. These patient who have additional needs, often receive less dental care compared to the general children, despite experiencing a higher prevalence of oral diseases.[2] The dental health status of these disabled groups should be enhanced through increased awareness facilitated by pediatricians, health visitors, and community and primary care teams.[3] Dental training involves briefing the importance of dental hygiene and demonstrating brushing and inter-dental cleaning, typically using visual aids such as disclosing agents and models. Nonetheless, there are situations in which such demonstrations and visual aids may not be appropriate, especially for children who are blind or have visual impairments.[4] It is crucial for these children to grasp not only the origins of oral diseases but also the preventive strategies to reduce them.[5] The absence of visual stimuli poses a challenge for dentists in motivating these individuals to uphold proper oral hygiene. Providing thorough dental care for blind children is not only rewarding but also constitutes a significant community service that pediatric dentists ought to endeavor to offer.[6]

In contrast to sighted children, a blind child depends considerably more on alternative senses, such as touch and

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hearing, for their learning process.7 This prompts an inquiry into the methods that can be utilized to instruct blind children regarding their oral care, considering that vision—the primary sense for acquiring knowledge—is unavailable. Educational strategies and techniques must be customized to address the unique requirements of the patients, while also integrating essential principles.[8] A multitude of studies have been recorded in dental literature concerning the delivery of oral health education (OHI) to blind children, which includes the implementation of self-educational manuals, audio recordings, and dental models, among other resources. This research evaluated a modified teaching approach, rather than a fundamental change in oral hygiene practices. The objective of the study is to provide dental health education to blind children through various sensory input methods and to evaluate the effectiveness of each technique both prior to and following the oral health education intervention.[9]

2. Materials and Methods

Research were carried in visually disable children's school in the region of Delhi NCR. The study was conducted upon 50 visually disable children of age group 3-14 years after proper consent was given by their parents or caregiver. The children were separated into two groups, each consisting of 25 individuals. Inclusion criteria for study children whose parents or guardian or caregivers are willing to give consent. Children who are completely blind. Children age between 3-14years. Exclusion criteria for study children with underlying systemic disease. Children undergoing orthodontic treatment. Uncooperative children. Children above the age group of 14.

The data was collected in 3 phases.

Phase 1: The clinical examination took place with the children seated comfortably in chairs, and the plaque index value was documented under sun light at education campus. The plaque index served to record the scores for all the children.

Phase 2: Both groups obtained dental education from a one source trained evaluator utilize various methods. This education covered various issue such as the significance of dental care, brushing demonstration, the significance of tooth brushing, interdental cleaning, the cause of oral caries and periodontal health, as well as protective methods, including the role of fluorides in maintaining healthy teeth.

Group I (Verbal): This sample was provided with oral health education, which included a single information session, and the dental health training was delivered through verbal sensory input.

Group II (Braille): This sample was provided with oral health education through distribution of leaflets that were printed in Braille script.

Phase 3: After 4 week interval the plaque score was again recorded and the difference was studied.

2.1. Statistical analysis

All collected data was input into the Microsoft Excel Sheet 2007 Version, and the acquired data will be analyzed using the (SPSS) Version 27 for detailed analysis and testing for significance. mean, standard deviation, and proportion will be computed for each clinical parameter, and a statistical t-test will be employed for the mean proportion.

3. Result

The result of the study is summarize in the tables below. (**Table 1**, **Table 2**)

Table 1: Efficacy of verbal sensory input and braille script sensory input in oral health promotion

Variable	Before instructions DMFT score	After instructions DMFT score
Verbal Instructions	3.20 ± 1.683	2.6 ± 1.000
Braille Instructions	4.44 ± 2.468	2.32 ± 0.627

$p \leq 0.05$ – Significant, CI = 95 %

Table 2: Comparison of efficacy of verbal sensory input and braille script sensory input in oral health promotion before and after instructions

Variable	$\bar{x}$	σ	t	p, S/NS
Before and After Verbal Instructions DMFT score	0.600	1.354	2.216	0.036, S
Before and After Braille Instructions DMFT score	2.120	2.147	4.937	0.000, S

$p \leq 0.05$ – Significant, CI = 95 %

4. Discussion

Dental education is a broadly recognized strategy for preventing oral diseases. It involves the dissemination of expertise and technique essential for enhancing the well-being. Recently, there has been a noticeable change in dental health education in India. The initiation of community based health service not only fosters fresh behaviors but also reinforces and sustains healthy practices designed to advance health outcomes across individuals and communities.[4] It has been informed that health care represents the most significant unmet need among individuals, particularly among the visually impaired, who experience dental health issues comparable to or exceeding those found in the population. Visually impaired child are entitled to the same opportunities for dental health and hygiene as their sighted counterparts. It is crucial to highlight the significance of health care for these child, as they are unable to visually assess their dental hygiene maintenance. In this current research, we observe in Table 1 a reduction in plaque scores after a 4-week interval.

We have also noted a marked inter-group difference noted between participants using Braille and those using verbal methods, indicating that the braille method is superior, as demonstrated in (**Table 2**). As evidenced by the research conducted by Yalcinkaya and Atalay.[5] braille is more effective than the verbal sensory method for promoting oral health. Similarly, a study by chowdary et. al. (2016)[7] categorized child without vision into 3 distinct groups based on various educational tools (verbal, braille text, and a mix of both) and assessed plaque and gingival index calculated at the end of three months, revealing reductions in both plaque and gingival scores across all criteria . Enhancing the dental health status of individuals with impairment is a challenging endeavor; however, this can be accomplished if guardian or caregivers receive proper health education, that is crucial to enhance and maintaining the oral health and, consequently, the overall general health of these student.

Organizations that offer specialized education for low vision child can assist children in enhancing their dental health practices by incorporating dental health maintenance into the curriculum. An substitute to a dental learning program could involve arranging regular visits for these children to dental hospitals, where they can consult with dental practitioners regarding to maintain hygiene.

5. Conclusion

The present research demonstrated that blind children are capable of maintaining an oral hygiene when showed to them using specialized technique, such as a multimodal approach, that has proven to be more superior to unisensory methods in promoting learning. It is advisable to maintain communication with guardian and caregivers, educating them on the importance of dietary modifications, improvements in hygiene, and the necessity of frequent dental visits for their child. Furthermore, oral health authorities should focus more on establishing dental health care programs in institutions for visually impaired children.

6. Ethical No:

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None.

8. Conflict of Interest

None.

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