Original Research

Evaluation of oral health status in visually impaired children and effectiveness of using two different communicating aids

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ABSTRACT:

AIM: The aim of the study is to evaluate effectiveness of two different communicating aids in dental health education among visually impaired children. Oral health status was assessed through plaque index, gingival index and DMFT index. Oral hygiene knowledge was assessed through questionnaire before and after oral health education.

MATERIALS & METHODS: The study involved 150 visually impaired children with the age range of 7 to 14 years of both genders from three blind schools similar in standard of teaching. The total study population (n = 150) was randomized and divided into three groups, comprising of 50 children in each group. The first two were experimental group who received dental health education through different aids while third group served as control. Oral health related knowledge and plaque score, gingival score and DMFT score were assessed in all the study groups.

RESULTS: After intervention, the mean knowledge score, mean plaque score and mean gingival scores were statistically significant in all study groups when compared to baseline scores.

CONCLUSION: The present study proved that visually impaired children can maintain an acceptable level of oral hygiene when taught with use of effective communicating aids.

KEY WORDS: visually impaired children, dental health education, oral health status

INTRODUCTION

The growth and development of the human skull & dentofacial region occurs in all the three dimensions of space leading to increase in size, alteration in shape, change in proportion and adjustment in position of various bones. This depends upon innumerable factors and if all conditions are favorable, a child acquires normal dentofacial skeleton pattern havingnormal dentition and esthetically pleasing facial profile, which possesses and does show some kind of proportional interrelationship between the maxilla and mandible.

Oral health is a vital component of overall health which contributes to each individual's well being and quality of life by affecting physical, mental well being, appearance and interpersonal relations [Mitrea AG and Karidis AG, 2001]1. Quality of life relates to the sense of well being of a person or community and is affected by different functional, social and psychological factors, which can be significantly impacted by oral health [Martu S and Popa T, 2008]2. The pain and discomfort associated with oral disease can be more disruptive and pre occupying than elsewhere in the body, because the oral cavity is central for many daily activities.

Visually impaired children tend to have more accidents than other children during the early years while they are acquiring motor skills. Hypoplastic teeth and trauma to the anterior teeth have been reported to occur with greater than average frequency in visually impaired children. Such children are also more likely to have gingival inflammation because of their inability to see and remove plaque.

Visually impaired children are challenged each day in learning everyday skills, maintaining proper oral hygiene being one. These children have been found to have poorer oral hygiene as compared to their sighted peers. The main factor of differentiation between normal patients and blind ones is the difficulty in removing plaque [Al Sarheed M et al 2006]4. The difficulty in removing bacterial plaque being the main factor for development of caries, continual motivation to the correct oral hygiene procedures is fundamental in order to keep a good oral hygiene in blind patients [Yalnacikaya SE and Atalaya T, 2006]5. The visually impaired people are at a greater risk to develop caries, since they are unable to see the early signs of caries such as discoloration which indicates the disease process.The patients handicapped by defective vision presents a special challenge to the dental healthcare team. Providing comprehensive dental care for the visually impaired children is not only rewarding but also a community service that healthcare providers are obligated to fulfill [Stephan HY, 1988]6 .

Aims and Objectives:

? To evaluate the prevalence of oral health status in visually impaired children.

? To evaluate the effectiveness of two methods of oral health education :

- Audio aids
- Pamphlets in Braille

MATERIALS & METHODS:

This study was carried in the Department of Pedodontics and Preventive Dentistry with the aim to assess the oral health status of visually impaired children studying in special blind schools. Study protocol was approved from ethical committee of the Dental college and hospital.

This cross sectional study with periodic observation comprised of randomly selected 3 different blind schools namely Aandh kanya Prakash School, School for the Blind, Ahmedabad and Blind School Gandhinagar. Total 150 children were selected by simple random sampling, with the age group of 7-14 years. Prior consent was obtained from the Principal of all the blind schools before undergoing examination of the children. Children were examined and the findings were recorded. The general information of the patient and hard tissue examination which included plaque index (Silness and Loe 1964)26, gingival index (Loe and Silness 1963)26 , DMFT (Henry, palmer and Knutson 1938)28 and dft index (WHO)29 were recorded in Performa. Also,the general questionnaire regarding the oral health practices were recorded by the examiner. The children were examined under natural daylight using standard

mouth mirror and CPITN probe (WHO Type III).

Exclusion criteria:

- Children with underlying systemic diseases or other handicapped condition.
- Uncooperative children.

Inclusion Criteria:

- Totally visually impaired and partially visually impaired children were included in the study.
- Children with age group of 7-14 were included.

Group division

- Group I consisted of 50 visually impaired children from School for The Blind, Ahmedabad

  (Ashram road) and they were given dental health education through Audio records.
- Group II consisted of 50 visually impaired children from Blind school Gandhinagar, who were given oral health education through Braille pamphlets.
- Group III consisted of 50 visually impaired children from Aandh Kanya Prakash School who acted as a control group and had not received any oral hygiene instructions.

Baseline evaluation

- Plaque index
- Gingival index
- DMFT index
- dft index

STEPS FOR STUDY

All the visually impaired children of group I received dental health education consisting of a single information session of dental health education. The mode of delivery of oral health education was through audio records. The oral health education encompassed topics like importance of teeth, type of dentition, brushing technique and importance of brushing, dental caries – its etiology, signs and symptoms, preventive methods, the role of fluorides and golden rules for having healthy mouth.

All children of group II received a comprehensive program consisting of a dental health education. Oral hygiene instructions were provided by using BRAILLE PAMPHLETS which included the same topics as in the group I.

The children in group III received no informational session or oral hygiene instructions and served as the control group. The follow up was carried out in all schools after 1 month.

Children's brushing time, sugar consumption, brushing frequency etc were evaluated by pre and post close ended questionnaire. Plaque score, gingival score, DMFT and dft score were also re-recorded after 1 month.

STATISTICAL ANALYSIS

All the collected data were evaluated using statistical packages for the social sciences (SPSS) version 18 software for windows. Analysis was done by using paired t test and independent t test. Intergroup comparison was performed using Wilcoxon Signed Rank test. The p value below 0.05 is considered as significant.

RESULTS

Table I : Intergroup comparison of pre and post mean plaque scores

Score	Group – I	Group – II	Group – III	*p* Value
Pre Plaque Score	1.45 ± 0.40	1.32 ± 0.48	-	0.32**
	-	1.32 ± 0.48	0.97 ± 0.46	< 0.05*
	1.45 ± 0.40	-	0.97 ± 0.46	< 0.05*
Post Plaque Score	0.75 ± 0.20	1.06 ± 0.33	-	< 0.05*
	-	1.06 ± 0.33	1.03 ± 0.43	0.89**
	0.75 ± 0.20	-	1.03 ± 0.43	< 0.05*

Independent t test * Significant ** Non significant

Table II : Intergroup comparison of pre and post mean gingival scores

Score	Group I	Group II	Group III	*p* Value
Pre gingival score	1.29 ± 0.33	0.98 ± 0.38	-	< 0.05*
	-	0.98 ± 0.38	0.73 ± 0.40	< 0.05*
	1.29 ± 0.33	-	0.73 ± 0.40	< 0.05*
Post gingival score	0.73 ± 0.17	0.74 ± 0.34	-	0.99**
	-	0.74 ± 0.34	0.79 ± 0.33	0.66**
	0.73 ± 0.17	-	0.79 ± 0.33	0.60**

Independent t test *- Significant **- Non significant

Table III : Intergroup comparison of pre values of questionnaire

Score	Group I	Group II	Group III	*p* Value
Brushing frequency Pre	.....	1.14 ± 0.35	-	0.22**
	-	1.14 ± 0.35	1.36 ± 0.48	0.15**
	1.02 ± 0.14	-	1.36 ± 0.48	<0.05*
Brushing time Pre	2.08 ± 0.66	2.24 ± 0.55	-	0.35**
	-	2.24 ± 0.55	2.08 ± 0.80	0.22**
	2.08 ± 0.66	-	2.08 ± 0.80	0.94**
Fluoridated Toothpaste Usages Pre	1.78 ± 0.41	1.56 ± 0.50	-	<0.05**
	-	1.56 ± 0.50	1.88 ± 0.32	0.28**
	1.78 ± 0.41	-	1.88 ± 0.32	0.18**
Sugar exposure Pre	1.92 ± 0.52	1.86 ± 0.49	-	<0.05*
	-	1.86 ± 0.49	1.40 ± 0.60	0.57**
	1.92 ± 0.52	-	1.40 ± 0.60	<0.05*
Methods of oral Hygiene Practice Pre	1.92 ± 0.27	1.00 ± 0.01	-	1.00**
	-	1.00 ± 0.01	1.00 ± 0.01	1.02**
	1.92 ± 0.27	-	1.00 ± 0.01	1.00**

Wilicoxon Signed Ranks Test * Significant ** Non significant

In this present study the oral health status of the visually impaired children were evaluated by using Plaque index (Silness & Loe 1964)26, Gingival index (Loe & Silness 1963)26 and DMFT index (Klein, Palmer & Knutson 1938)28. The oral health knowledge of the children was evaluated by using close ended questionnaire. After 1 month of intervention and oral health education in group I and group II, the oral health status of all the children was assessed and the same questionnaire was used to check their oral health knowledge.

The mean DMFT and dft scores of group I, II & III were 1.45 ± 0.40, 1.32 ± 0.48 and 0.97 ± 0.45 respectively.

In group I the pre questionnaire value of brushing frequency, brushing time, fluoridated toothpaste usages, sugar exposure and methods of oral hygiene practice were 1.02 ± 0.14, 2.08 ± 0.66,1.78 ± 0.41, 1.92 ± 0.52 and 1.92 ± 0.27 respectively. After giving oral health education in group I through audio aids, there was significant increase in brushing frequency (1.92 ± 0.27), duration of brushing (2.84 ± 0.37) and usages of fluoridated toothpaste (1.98 ± 0.14), methods of oral hygiene practices (2.00 ± 0.01) and decreases in sugar exposure (1.06 ± 0.24).

In group II the pre questionnaire value of brushing frequency, brushing time, fluoridated toothpaste usages, sugar exposure and methods of oral hygiene practice were 1.14 ± 0.35, 2.24 ± 0.55,1.56 ± 0.50, 1.86 ± 0.49 and 1.00 ± 0.01 respectively. After giving oral health education in group II through Braille pamphlets, there was significant increase in brushing frequency (1.78 ± 0.41), duration of brushing (2.82 ± 0.38) and usages of fluoridated toothpaste (1.98 ± 0.14), methods of oral hygiene practices (2.00 ± 0.01) and decreases in sugar exposure (1.14 ± 0.35).

In group III the pre questionnaire value of brushing frequency, brushing time, fluoridated toothpaste usages, sugar exposure and methods of oral hygiene practice were 1.36 ± 0.48,2.08 ± 0.80,1.88 ± 0.32,1.40 ± 0.60and 1.00 ± 0.01respectively. After intervention no significant changes in brushing frequency (1.31 ± 0.46), duration of brushing (1.90 ± 0.70) and fluoridated toothpaste usage (1.88 ± 0.32), methods of oral hygiene practices (1.00 ± 0.01) and decreases in sugar exposure was seen (1.72 ± 0.57). Intergroup comparison of pre values of questionnaire shows variation in all 3 groups.

DISCUSSION

Visual impairment is one of the disability may have limited eye - hand coordination or manual dexterity, which is necessary to execute adequate oral hygiene skills such as brushing and flossing. Also it has been reported that the other factors such as lack of parental supervision, and the child's reduced concern for his/her appearance, put them at higher risk of developing dental diseases. These children have poor oral hygiene, gingivitis and periodontal diseases as reported by Reddy VK (2011)23, Shetty et al (2012)24 and Ahmad MS (2009)14.

The awareness about dental health care need is essential for visually impaired children, as they have poor oral health knowledge as compared to normal sighted children. So there is utmost need of training these individuals in oral health care. Nandini NS (2003)10, Cantor LE (2005)13, Hebbal M (2012)21, Shetty V et al (2013)24, Kumar K (2013)25 stated that the improvement in oral health status of the visually impaired children also seen after giving oral health education to them. So in this study we used two differentmethods of oral health education i.e. audio instructions and Braille pamphlets to deliver and improve their oral health knowledge.

The age group selected here was 7-14 years, as this age group is of major concern because of varying food habits, oral hygiene practices etc which was also seen in the study done by Yalcinkaya SE (2006)5, Mahantesh BS et al (2011)15 , Reddy VK (2011)16 , and Prashant ST et al (2011)17.

The results of our study showed that there was significant improvement in the plaque score in group - I & II from fair to good following the oral health education instructions. Hence the improvement in plaque scores was found following the health education. The result of our study was in accordance to study done by Anaise JZ (1979)8, Cohen S et al (1991)9, Nandini et al (2003)10 , Shih YH (2004)12, Yalcinkaya SE (2006)5, and Kumar et al (2013)25 Also the results suggested that oral instruction by using audio aids was more effective compared to instructions given through Braille pamphlets, the possible reason for that could be that the audio aids may have a greater impact on the children and probably could have aroused interest in the subject, leading to better gain in knowledge as compared to Braille in which its dependent on children to gain the knowledge by self study.

In our study it was shown that there was significant improvement in gingival scores of group I & II following the oral health education instructions. The gingival health status changed from moderate gingivitis to mild gingivitis in these children following health education. Visually impaired children are more likely to have gingival inflammation because of their inability to see and remove plaque which was also mentioned by Mac Donald RE (2004)3 and Ozenen et al (2012)20. The similar results were obtained in the study done by Cheung EYC (2005)11, Yalcinkaya SE (2006)5 and Shetty et al (2012)19. Results also suggested that oral health instruction given using audio aids was more effective compared to instructions given through Braille pamphlets.

On determining the caries status in our study using the DMFT and dft index it was revealed that no major changes occurred within the span of one month recall check up. Anaise JZ (1979)8 also proposed that children with visual impairment can be at disadvantages as they are not in a position to detect and recognize early diseases visually. Similar findings were obtained in the study done by Anaise JZ (1979)8, Ahmad SM (2009)14, Shetty V et al (2012)24 and Kumar et al (2012)25.

On comparing the results of pre and post questionnaires answers following health education in group I (audio aids) and group II (Braille Pamphlets) it was revealed that there was significant improvement in brushing frequency, ideal brushing time, usage of fluoridated toothpaste, awareness regarding the various method of oral hygiene practice and decreased sugar exposure. The beneficial effect of this education was observed in the increased number of correct responses by the children of experimental groups (group I and group II). Similar findings were seen in study done by According to Nandini NS (2003)10, shih and chang (2004)12, Cantor LE (2005)13. Visually impaired children usually have poor oral health knowledge as compared to normal sighted children. These individuals often have worse oral health status than the general population which also seen in the study done by Joharah AJ (2013)22 and Reddy VK (2013)23. In visually impaired children maintenance of oral hygiene remains the most outstanding challenges Greelev CB (1976)7.

Initially, the children perceived oral and general health to be two different aspects, but after the oral health education, most children in group I and group II understood that both of them are interrelated therefore improvement in knowledge with regard to these questions may have been noted in the two groups.

However better results were obtained in group I (Audio aids) as compared to children in group II (Braille pamphlets).

CONCLUSION

From the present study the following conclusion can be drawn:

1. The oral health status of visually impaired children improved after giving oral health education.

2. Maximum improvement in plaque score were seen in visually impaired children given oral hygiene instructions orally followed by improvement in plaque score of visually impaired children given oral hygiene instructions by Braille pamphlets.
3. Maximum improvement in gingival score were seen in visually impaired children given oral hygiene instructions orally followed by Improvement in gingival score of visually impaired children given oral hygiene instructions by Braille pamphlets.

REFERENCE

1. Mitrea AG, Karidis AG. Oral health status in Greek children and teenagers with disabilities. J Clin Pediatr dent 2001; 26(1): 118-8.
2. Martu S, Popa T. The impact of oral health on the quality of life for the patient with periodontal disease. Romania, Bulgaria, http://www.dentomis.ro/revistalreviste/V42008/V4-08-7.2008; 4(4): 38-39.
3. Mcdonald RE, Avery DR, Dean JA. Dental problems of children with disabilities. Dentistry for the child and adolescent. 8th ed. Mosby publication, 2004; 550-1.
4. Al Sarheed M, Bedi R, Alkhatib MN, Hunt NP. Dentist's attitude and practices towards provision of orthodontic treatment for children with visual and hearing impairments. Spec Care Dentist 2006; 26(1): 30-6.
5. Yalcinkaya SE, Atalay T. Improvement of oral hygiene knowledge in a group of visually impaired students. Oral Health Prev Dent 2006; 4(4): 243-53.
6. Stephen HY. Pediatric dentistry, Dentistry for special patients, Total patient care. Philadelphia, Lea and Febiger. 1988; 573-4.
7. Greelev CB, Goldstein PA, Forrester DJ. Oral manifestation in a group of blind children. ASDC J Dent Child 1976; 43(1): 39-41.
8. Anaise JZ. Periodontal diseases and oral hygiene in a group of blind and sighted Israeli teenagers. Community Dent Oral Epidemiol 1979; 7(6): 353-6.
9. Cohen S, Sarnat H & Shalgi G. The role of instructions and brushing device on oral hygiene of blind children. Clin Prev Dent 1991; 13 (4): 8 -12.
10. Nandini NS. New sight into improving the oral health of visually impaired children. J Indian Soc Pedod Prev Dent 2003; 2(14): 142-3.
11. Cheung EYC, Tse C, Wong MCM. Oral health education for visually impaired children in Hong Kong 2004. Health Services Research squeal no.2.
12. Shih YH & Chang CHS. Teaching oral hygiene skills to elementary students with visual impairments. J Visual Impair Blin 2005; 99(1): 1-28.
13. Cantor LE. Effect of guided tooth brushing on oral hygiene performance of blind children of Northen Luzon association for blind. UB Res J 2005; 31(1): 55-7.
14. Ahmad MS, Jindal MK, Khan S and Hasmi SH. Oral health knowledge, practice, oral hygeine status and dental caries prevalence among visually impaired students in residential institutes of Aligarh. J Dent Oral Hyg 2009; 1(2): 22-6.
15. Mahantesh B, Ankola A, Arora D, Singhal D, Singh D, Naik K. Oral health attitude and awareness among school children. World J of Sci and Tech 2011; 1(6): 43-51.
16. Reddy VK, Sharma A. Prevalence of oral health status in visually impaired children. J Indian Soc Pedod Prev Dent 2011; 29(1): 25-7.
17. Prashant ST, Bhatnagar S, Das UM, Gopu H. Oral hygiene status, practice, oral hygiene status and dental caries prevalence among visually impaired children in Bangalore. J Indian Soc Pedod Prev Dent 2011; 29(2): 102-5.
18. Kumar S, Konde S, Raj S, Agarwal M. Effect of oral health education and fluoridated dentifrices on the oral health status of visually impaired children. Contemp Clin Dent 2012; 3(4): 398-401.
19. Shetty V, Hegde AM, Bhandary S, Raj K. Knowledge of care providers regarding the oral health of visually impaired children. J Clin Pediatr Dent 2012; 36(4): 411-6.
20. Ozenen O, Sungurtekin E, Cildir S, Sandalli N. A comparison of oral health status of children WHO are blind and children who are sighted in Istanbul. J Visual Impair Blin 2012; 106(6): 362-7.
21. Hebbal M, Ankola AV. Development of a new technique (ATP) for training visually impaired children in oral hygiene maintenance. Eur Arch of Pediatr Dent 2012; 13(5): 244-7.
22. Joharah AJ, Sinaidi AL. Oral hygiene practice and periodontal health status of visually impaired Saudi adults in Riyadh, Saudi Arabia. Pak Oral Dent J 2013; 33(1): 82-6.
23. Reddy VK, Chaurasia K, Bhambal A, Moon N, Reddy EK. A comparison of oral hygiene status and dental caries experience among institutionalized visually impaired and hearing impaired children of age between 7-17 years in central India. J Indian Soc Pedod Prev Dent 2013; 31(3): 141- 5.
24. Shetty V, Hegde AM, Varghese E, Shetty V. A novel music based tooth brushing system for blind children. J Clin Pediatr Dent 2013; 37(3): 51-5.
25. Kumar RVS, Fareed N, Shanthi M. The effectiveness of oral health education program with and without involving self maintainable oral hygiene skill among the visually impaired children. Int J of Scientific Study 2013; 1(3): 51- 9.
26. Loe H. The gingival index, plaque index and the retention index system. J of Periodontol 1967; 38(6): 613 – 5.
27. Loe H, Silness P. Periodontal diseases in pregnancy. Acta odontol scan 1963; 21: 533-51.
28. Klein H. Palmer CE, Knutson JW. Dental status and dental needs of elementary school children. Public health report. 1938; 53: 751 - 65.
29. WHO. Oral health survey, Basic methods, 4th edition, WHO Geneva, 1997.

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Source of Support : NIL
Conflict of Interest : NOT DECLARED
Date of Submission : 18-04-2018
Review Completed : 18-06-2018