Effect of Auditory Aid in Improving Oral Hygiene among Visually Impaired Children in Chandigarh City, India - A Longitudinal Study

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Abstract

Objective: To assess the effect of auditory aid in improvement of oral hygiene among visually impaired children in Chandigarh city.
Materials and Methods: Fifty totally blind caries free children were selected and were given oral hygiene instructions for a period of one month daily. The Oral hygiene index OHI(S) and gingival index GI was recorded on a structured format at baseline and three months follow-up.
Results: The oral hygiene and gingival status of the children were found to be relatively moderate to poor. The percentage use of toothbrush among the children was also found to be less (52%) at baseline. At three months follow up there was a considerable improvement in brushing as well as the oral hygiene (53.1%) and gingival status (56%).
Conclusion: A large group of such children are neglected for their dental health. Hence, regular dental checkups should be made mandatory to such special care need children so that dental problems can be diagnosed at initial stage and can be well treated on time.

Introduction

Oral health is a vital component of overall health, which contributes to each individual's well-being and quality of life by positively affecting physical, social and mental health, appearance and interpersonal relations [1]. Individuals with special needs start their life with teeth and gums that are as strong and healthy as those of the normal people. However, their diet, eating pattern, medication, physical limitations, lack of cleaning habits and attitudes of parents and health providers, all contribute to poor oral health of the handicapped [2].

The American Health Association defines a child with disability as a child who for various reasons cannot fully make use of all his or her physical, mental and social abilities [3]. Blindness has been defined by WHO as having a 'visual acuity of less than 3/60m or corresponding visual field loss in the better eye with the best possible correction.' meaning that whilst a blind person could see three meters, a non-visually impaired person could see 60 meters. The prevalence of blind children globally is estimated to be 1.4 million, three-quarters of whom live in the poorest regions of Africa and Asia [4].

Oral hygiene practices play an important role in prevention of oral diseases. The key aspects of oral hygiene practices include the frequency of tooth brushing per day, teeth cleaning before going to bed, teeth cleaning using tooth brush and dental floss and regular dental visits [5,6]. The studies have reported that the individuals with visual impairment, like other disabilities have high amount of oral diseases compared to sighted individuals [7].

As of now, there is no literature found regarding the oral hygiene status for visually impaired individuals in Chandigarh city hence, the aim of the present study was to investigate the oral hygiene status of visually impaired children before and after imparting oral hygiene instructions during a period of three months.

Materials and Methods

A longitudinal study was conducted among 50 caries free aged 8-23 years totally blind children of Institute for blind in Chandigarh. All the children were residing in the institute and were above the age of 8 years so as they could understand the communication. The oral hygiene index and gingival index were recorded on a structured format at baseline and one month after imparting regular oral hygiene education through computerized auditory aid. The auditory aid was played daily in the morning for one month. All the children were then received one-to-one oral hygiene education and motivation by the institution teachers so that they could learn proper brushing skills. All the scores were recorded by a single investigator.

The data was analyzed using SPSS version 25. Chi square analysis was used to find the significance of the cross-tabulation of counts of two or more variables. Student *t*-test (Unpaired) and Analysis of Variance (ANOVA) were used to find the significance of the cross-tabulation of a variable with the mean of another variable.

Results

Out of total of 50 totally blind children, 31 (60.2%) were males and 19 (39.8%) were females. Age and gender wise distribution of children is shown in *Table 1*. At baseline it was found that 74% (37) of the children cleaned their teeth which increased to 88% (44) at three month follow up. The distribution of oral hygiene practices amongst the children at baseline and at three months follow up is shown in *Table 2*. A considerable amount of improvement was observed in frequency and type of brushing.

Oral hygiene index simplified scores at base line revealed that only 31.6% (16) had good hygiene which was found to be better and increased to 53.1% (26) after imparting education.

Table 1. *Distribution of study subjects according to gender and age groups.*

Age group	Male	Female	Total
8-12 years	11 (35.4%)	6 (31.5%)	17 (34%)
13-17 years	8 (25.8%)	11 (57.8%)	19(38%)
18-23 years	12 (38.7%)	2 (10.5%)	14 (28%)
Total	31 (100%)	19 (100%)	50 (100%)

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***Table 2**. Showing the distribution of Oral Hygiene Practices amongst study subjects.*

AT BASELINE	TYPE OF CLEANING			MATERIAL USED		FREQUENCY OF CLEANING		
	No aid used	Toothbrush	Finger	No material	Toothpaste	Once daily	Twice daily	Occasionally
	13 (26%)	26 (52%)	11 (22%)	31 (62%)	19 (38%)	21 (56.7%)	7 (18.9%)	9 (24.3%)
		Total- 37				Total- 37 (100%)		
AT THREE MONTHS FOLLOWUP	6 (12%)	41 (82%)	3 (6%)	7 (14%)	43 (86%)	19 (43.1%)	23 (52.2%)	2 (4.5%)
		Total-44				Total- 44 (100%)		

***Table 3.** Showing mean OHI(S) and GI scores according to age.*

AT BASELINE	Mean OHI (S) score			Mean GI score		
	8-12 years	13-17 years	18-23 years	8-12 years	13-17 years	18-23 years
	1.31 ± 0.73	1.89 ± 0.94	2.06 ± 0.77	0.23 ± 0.04	0.6 ± 0.01	0.19 ± 0.38
AT THREE MONTHS FOLLOWUP	0.91 ± 0.86	1.76 ± 0.72	1.97 ± 0.83	0.11 ± 0.28	0.06 ± 0.20	0.13 ± 0.33

P value<0.002* (Statically significant)

Gingival scores revealed that more than 66% (33) of the children had benign to moderate gingivitis which considerably was found better at three months follow up and found that 56% (28) of the children had healthy gingiva. The mean OHI (S) and mean GI scores are shown in *Table 3*.

Discussion

Vision may be the most important sense for interpreting the world around us. Visual defects are one of the most common causes of disability in the world [8]. It has been estimated that the level of oral diseases is higher among visually impaired than sighted individuals [9,10]. Studies have shown that people with visual disability have higher incidence of dental caries and consistently poorer state of oral hygiene, with various levels of periodontal diseases and difficulty in accessing dental care [11,12]. They cannot visualize the plaque on the teeth surfaces so even understanding the importance of oral hygiene is difficult for them, which results in the progression of dental caries as well as inflammatory disease of the periodontium [13].

The removal of plaque and debris from the teeth is a skill that can be mastered only when an individual has the dexterity to manipulate the toothbrush and understand the objectives of its activities [14]. In the study, it was found that most of the children had moderate to fair oral hygiene at baseline which significantly improved after imparting auditory instructions and regular supervision. The reasons for poor oral hygiene in disabled individuals have been attributed to low powers of concentration and lack of motor skills and lack of manual coordination in such individuals [15,16]. Another reason might be problems in communication/understanding of instructions and poor co-operation leading to difficulty in learning and adaptation of the oral hygiene practices [17].

The auditory aid used in the study was found to be an effective measure in improving the oral hygiene of the children. Apart from this, commercially available powered toothbrushes can be a useful aid in cleaning teeth for such group.

Since the sample size in the study was less, thus this study can be used as a pilot study for further investigations.

Conclusion

Absence of visual stimuli prevents rapid learning and represents a great challenge to dental doctors in maintaining and motivating appropriate oral hygiene in such individuals. However, it can be found that if trained and oriented properly these children can able to learn satisfactory brushing techniques thus maintaining healthy oral hygiene.

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