



Impact of Oral Hygiene Instructions in Maintaining Oral Health of Visually Impaired and Sighted Children: A Comparative Study

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Article History

Volume 6 issue 10, 2024

Received: 15 May 2024

Accepted: 15 June 2024

doi:

10.48047/AFJBS.6.10.2024.7240-7248

Abstract

Background: Vision is the most vital sense for interpreting the environment around us. Visually impaired children are challenged every day in learning basic life skills, upholding proper oral hygiene being one among them. Oral health education has a positive impact in maintaining the oral hygiene of individuals.

Aim: The aim of the study is to assess the prevalence of dental caries and oral hygiene among visually impaired children and children without any visual disability.

Material and Method: A total of 60 children were selected for the study ranging from 8-12 years of age group and divided into two groups. Group I include visually impaired children and Group II includes children without any visual disability. At an interval of 1 month, two visits will be paid. At 1st visit DMFT, def, OHI-S and Modified Quigley & Hein indices were scored, two tone disclosing agent was used for OHI-S and Modified Quigley & Hein index. Afterwards, children were verbally educated about the importance of oral hygiene and its maintenance. On 2nd visit, again all the indices were performed and scored. The recorded score was compared to the

previous scores and the comparison was done between these two groups.

Result: Results indicate both groups showed statistically significant with decreased oral

hygiene score after getting oral hygiene instruction.

Conclusion: It was concluded that oral hygiene programme was more effective in improving the oral hygiene status of both groups.

Key word: Oral hygiene, DMFT, def, OHI-S, Modified Quigley& Hein index

INTRODUCTION:

“The best and the most beautiful things in the world cannot be seen or even touched. They must be felt with the heart”-Hellen Keller.¹

When it comes to an individual's physical and mental well-being, appearance, and interpersonal relationships, oral health is a crucial part of overall health, which in turn improves everyone's quality of life and physical and mental health²

World Health Organization (WHO) defined Health as “a state of complete physical, mental, and social well-being, rather than solely the absence of disease.”³

Children with special health care needs require greater attention to their oral health. Oral hygiene has profound biological, psychological, and social projections since it influences one's aesthetic. Equal chances for oral health and hygiene should be extended to those with impairments as well as to healthy individuals. Unfortunately, among the most neglected medical needs of the disabled is dental health care.⁴

According to Chang and Shih, oral hygiene is ignored among children with disabilities since it is more important to teach them how to handle their disabilities. As a result, these children have higher rates of oral diseases.⁵

Blindness is defined by WHO as having “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 3m, a non-visually impaired person could see 60m.⁶

An estimated 1.4 million blind children reside in the world, with over 75 percent of them being in developing countries.⁷ The magnitude of the problem in India is substantially higher, with almost 12 million blind people, accounting for one-fourth of the world's blind population.⁸ The prevalence of blindness in children varies from 0.3/1000 in affluent areas to 1.5/1000 in the poorest communities. Childhood blindness accounted for 28.7% of India's overall economic burden of blindness.⁹ It is anticipated that 0.9 out of 1000 children in low-income Asian nations may experience childhood blindness.¹⁰

The oral health of those with visual impairments can be negatively impacted since they rely more on sound, voice, and touch for situational orientation and may not be able to identify early signs of oral disease or take prompt action unless informed.¹

Learning daily skills, such as maintaining good dental hygiene, is a daily struggle for visually impaired youngsters. It has been discovered that these children do not practise as good dental hygiene as their counterparts who are sighted. It is crucial to receive adequate information on how to take care of the teeth and oral tissue.²

Oral hygiene training consists of an explanation of the objective of oral hygiene and demonstrations of teeth brushing and interdental cleaning utilising visual aids such as disclosing tablets and models.¹¹

Keeping all the above points the present study was conducted to assess the impact of oral hygiene instructions in maintaining oral health of visually impaired and sighted children.

Objectives of the study: This study was carried out to:

- Estimate the caries prevalence and experience among study population.
- Compare the caries experience among visually impaired individuals and normal students

MATERIALS AND METHODS

Study design

The present study was conducted in Success Primary School and Brij Mohan School for the blind, Meerut, Uttar Pradesh. The study is in comparative nature aimed for evaluation of oral hygiene between sighted and visually impaired children.

The study protocol was approved by the Institutional Ethical Committee.

Study population

A total of 60 children were selected for the study, aged between 8-12 years. The total no. of 60 children was equally divided into 2 groups of 30 each. The groups are as follows:

Group 1 – Visually impaired children

Group 2 – Children without visual disability

Inclusion and exclusion criteria:

All institutionalized visually impaired students aged 8-12 years residents of the institution were included in this study. Equal number of normal students with comparable ages were kept as controls. Those students affected with mental retardation, physically and mentally handicapped, orthopedic defects, cerebral palsy and medically compromised were excluded from the study. Prior consent

Material used: Mouth Mirror (No 4 /Waldent), Explorer (No 23/ Waldent), Tweezer (Waldent), Kidneytray(200 mm), Spirit, Cotton roll, Stainless Steel autoclave Drum, Green cloth, Disposable gloves, facemask, headcap, Disclosing-agent (Two tone disclosing agent/ AlphaPlac) [Fig 1]

Fig 1: Armamentarium used for study

Oral health status of all the children were recorded using a modified WHO oral health assessment form 1997.^[2] The study was conducted at an interval of one month. On 1st visit at the beginning of month DMFT, def, OHI-S and Modified Quigley&Hein indices are scored, two tone disclosing agent is used as an aid to Modified Quigley&Hein index.

OHI-S has two components, the Debris Index-Simplified and the Calculus Index-Simplified, both of which are calculated separately and are added to get the OHI-S score for an individual.

OHI-S scores may be interpreted as; Good (0–1.2), Fair (1.3–3.0) and Poor (3.1–6.0). The DMFT score of the samples were determined based on the results of clinical examination and calculation of the number of Decayed (D), Filled (F), and Missing (M) teeth due to caries. The “d” and “f” of the def represent decayed and filled primary (deciduous) teeth, whereas the “e” represents teeth that should be/were extracted. Children were examined at their respective school using hand torch and diagnostic set of instruments seated on an ordinary chair. All examinations were conducted by the same examiner.

For scoring plaque, Modified Quigley & Hein index was used, two tone disclosing agent was applied on a fresh cotton swab till the swab was fully saturated. Subsequently, the swab gently applied on the tooth surfaces. Excess solution was washed away by allowing the children to rinse with tap water once. [fig 2a-c]

Afterwards, children will be verbally educated about the importance of oral hygiene and its maintenance. On 2nd visit at the end of 30 days, again all the indices were be performed and scoring was be done. The recorded scores were be compared to the previous scores and the comparison was done between the two groups and conclusion was drawn.

Fig 2(a): Before applying disclosing agent

Fig2(b): After applying disclosing agent

Fig 2(c): After removing excess of disclosing agent

STATISTICAL ANALYSIS

The data for the present study was entered in the Microsoft Excel 2007 and analyzed using the SPSS statistical software 23 Version. The descriptive statistics included mean, standard deviation. The intragroup comparison for the different time intervals was done using paired t test to find the difference between the individual time intervals. The level of the significance for the present study was fixed at 5%.

The intergroup comparison for the difference of mean scores between two independent groups was done using the unpaired/independent t test

The Shapiro–Wilk test was used to investigate the distribution of the data and Levene’s test to explore the homogeneity of the variables. The data were found to be homogeneous and normally distributed. Mean and standard deviation (SD) were computed for each variable

RESULT

A total of 60 children were examined, 30 children from blind school and another 30 from other school with children who were not visually impaired.

The mean debris score in the blind children at the Ist visit was 1.40 ± 0.59 , in the IInd visit was 1.02 ± 0.75 , In the normal children the mean debris score was 0.68 ± 0.44 in the Ist visit and 0.39 ± 0.35 in the IInd visit. The mean change in the debris score from Ist to visit was 0.38 ± 1.00 in the blind children, 0.29 ± 0.51 in the normal children and difference between the groups was statistically non-significant

The mean calculus score in the blind children at the Ist visit was 1.36 ± 0.68 , in the IInd visit was 0.69 ± 0.63 , In the normal children the mean calculus score was 0.96 ± 0.36 in the Ist visit and 0.59 ± 0.32 in the IInd visit. The mean change in the calculus score from Ist to visit was 0.66 ± 1.10 in the blind children, 0.37 ± 0.41 in the normal children and difference between the groups was statistically significant

The mean OHI-S score in the blind children at the Ist visit was 2.27 ± 1.45 , in the IInd visit was 1.45 ± 1.16 , In the normal children the mean OHI-S score was 1.67 ± 0.44 in the Ist visit and 0.99 ± 0.46 in the IInd visit. The mean change in the OHI-S score from Ist to visit was 0.81 ± 1.55 in the blind children, 0.68 ± 0.61 in the normal children and difference between the groups was statistically non-significant. (Table 1)

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DISCUSSION

Visual impairment affects oral health through physical, social, or informational barriers caused by the impairment, an attendant medical condition (and associated medical problems), or a lack of tailored knowledge. Other limitations include a lack of education and training for services delivered to a specific group.⁵

Oral disease is a significant health issue among people with disabilities. The prevalence and severity of oral disease in this group are higher than in the overall population. These results may be attributed to lack of manual dexterity thus leading to inability to clean.³

Oral health may be affected by the following:³

- ✓ Limited understanding on the importance of oral health management,

- ✓ Difficulties in communicating oral health needs,
- ✓ Anticonvulsant medications that impact upon gum health and
- ✓ A fear of oral health procedures.

Often dental plaque is the main reason for the development of periodontal diseases and dental caries. Early signs may be unnoticed for people with low vision, and because of this they may not be able to take the necessary action to prevent or treat a particular oral condition. Gingivitis is more common in visually challenged children. In our study, comparison of oral hygiene status was done using DMFT, deft, OHI-S and Modified Quigley & Hein indices were scored, two tone disclosing agent is used as an aid to Modified Quigley & Hein index among visually impaired and sighted children.

The present study showed debris index scores among the normal children, 70% were having good hygiene, 30% were having fair hygiene. Among the blind children, 3.3% were having good hygiene, 60% were having fair Hygiene and 36.7% were having poor hygiene, calculus scores among the normal children, 66.7% were having good hygiene, 33.3% were having fair hygiene. Among the blind children, 23.3% were having good hygiene, 43.3% were having Fair Hygiene and 33.3% were having poor hygiene, OHI-S scores among the normal children, 80.0% were having good hygiene, 20.0% were having fair hygiene. Among the blind children, 26.7% were having good hygiene, 36.7% were having Fair Hygiene and 33.3% were having poor hygiene, DMFT Scores higher in the blind children as compared to the normal children, deft Scores 50.0% of the normal children were having deft Score -0, among the blind children, 83.3% were having deft Score -0. Based on the plaque Scores 34.5% of the normal children were having plaque Score 1, among the Blind children, 16.7% were having plaque Score 1.

After an interval of one month, the present study showed that a proper method of educating the visually impaired and sighted children decreased the score, which in turn improved oral hygiene.

Shawet al¹³ reported dmft and DMFT values of 1.36 and 1.85, respectively, for children with disabilities; Gizani et al¹⁴ reported a mean DMFT value of 2.9; and Shyama et al¹⁵ reported a mean DMFT of 4.5 for this group. It is most likely that the most significant factor in improving the oral health status of handicapped children is the awareness of their families about importance of oral hygiene habits. A previous study was done in India (2013), reported a mean DMFT and dmft values of 1.1/0.17 and dmft 0.87/0.47 in visually impaired and normal children respectively, the children aged 6 to 15 years.¹⁶ Another study was done also in India showed that the mean DMFT and dmft for visually impaired subjects were 1.48, 0.28 respectively (aged 4 to 23 years).¹⁷

Study by Aguiar et al. confirmed that there was marked reduction in rates of biofilm and good oral hygiene can be achieved by the usage of appropriate brushing techniques which favour the present study. Proper education and motivation were the key behind the success in these visually impaired children.²¹

Vargas and Goulart in their study showed that, even though they cannot see it, visually impaired patients do express concerns about the functional aspects of oral cavity. These individuals understand the functional importance of the teeth and mouth, citing the pain as the main factor in seeking care. The aesthetic aspect of oral hygiene is rarely mentioned and seems to have less relevance to these individuals.²²

Prashanth et al., 2011 examined 85 visually impaired children in Bangalore, to assess the oral health knowledge, practice, oral hygiene status, and dental caries prevalence; and they stated, "a little extra care by the parent or caretaker regarding oral hygiene can give drastic results in reduction of dental caries."¹⁹

A study by Al-Qahtani & Wyne, 2004 assessed the caries experience and oral hygiene of visually and hearing disabled children and young adults and they found that caries experience among the disabled population was clearly higher than the normal population.²⁰

Liu et al., 2019 assessed the oral health status of visually impaired schoolchildren in northeast China and they exhibited a high prevalence of dental caries, poor periodontal health, and severe malocclusion in this group of children.¹⁸

In contrast to the present study, many studies reported that the caries experience was significantly higher in visually impaired population than the normal population as Shyama et al., 2011 study. Studies from the University of Hong Kong, have found that the oral hygiene of the blind population is significantly worse than in an equivalent sighted one.²³ A study completed by Chang and Shih (2004), found that students with visual impairments were less knowledgeable about their oral care. Eighty percent of these students with visual impairments did not realize the need to have regular dental visits, and only 18% of the students had routine dental care.²⁵ It was also found in a study by Nandini, that 37% of participants were affected by dental caries and 71% by gingivitis.²⁶

In a study conducted by Mendonça, it was stated that the absence of visual stimuli prevents rapid learning, representing a challenge for surgeons and dentists in motivating these individuals to have appropriate oral hygiene. However, it is arguable that, when well-trained, blind children can learn the brushing techniques, thus maintaining good oral condition.²⁴

LIMITATION

1. Our study had a limited sample size due to ease of availability of the sample in the school. However, the study would have benefitted more if done in the community setup with large sample size for better results.
2. Longer follow-up required to assess the impact of the program on oral health behaviour.

CONCLUSION

The present study emphasizes on the positive impact of oral health education on oral hygiene status of visually impaired children. An oral health educational program was implemented on every child participating in the study. Following the introduction of an oral health educational programme, visually impaired and normal groups showed a significant decrease in plaque, debris, and calculus scores, as well as an increase in knowledge, attitude, and practice of oral hygiene within a month. Therefore, children may be managed well with sufficient training, providing complete dental treatment for the visually impaired is not only delightful but also a community obligation that health-care providers are expected to fulfil.

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Fig 1: Armamentarium used for study



Fig2 (b): After applying disclosing agent

Fig 2(c): After removing excess of disclosing

Table1: Intergroup Comparison Of Change In The Debris, Calculus And OHI-S Scores Between Normal And Blind Children.

		Ist Visit	IInd Visit	Mean Change	P value
Debris Score	Blind	1.40±0.59	1.02±0.75	0.38±1.00	0.435 (Non- Sig)
	Normal	0.68±0.44	0.39±0.35	0.29±0.51	
Calculus Score	Blind	1.36±0.68	0.69±0.63	0.66±1.10	0.038 (Sig)
	Normal	0.96±0.36	0.59±0.32	0.37±0.41	
OHI-S Score	Blind	2.27±1.45	1.45±1.16	0.81±1.55	0.673 (Non-Sig)
	Normal	1.67±0.44	0.99±0.46	0.68±0.61	

Independent t test at p value less than 0.05.

Table 2: Intragroup Comparison of Debris, Calculus And OHI-S Scores Between Ist and IInd Visit in Normal and Blind Children.

		Ist Visit	IInd Visit	P value
Debris Score	Blind	1.40±0.59	1.02±0.75	0.001 (Sig)
	Normal	0.68±0.44	0.39±0.35	0.001 (Sig)
Calculus Score	Blind	1.36±0.68	0.69±0.63	0.001 (Sig)
	Normal	0.96±0.36	0.59±0.32	0.001 (Sig)
OHI-S Score	Blind	2.27±1.45	1.45±1.16	0.001 (Sig)
	Normal	1.67±0.44	0.99±0.46	0.001 (Sig)