The Prevalence of Dental Caries and Gingival diseases in institutionalized Special Children of 6-12 years of age in Ahmedabad City (Gujarat, India)

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ABSTRACT

Objectives: This study was carried out with the objective of determining the prevalence of dental caries and gingival diseases in institutionalized hearing and speech-impaired children of 6-12 years of age. **Methods:** This cross sectional study involved 100 hearing and speech-impaired institutionalized children of age group 6 – 12 years. DMFT index was used to measure dental caries and Loe and Silness Gingival Index was used to measure gingival disease. The indices were recorded using mouth mirror, explorer and periodontal probe in normal day-light. **Results:** The mean DMFT+dmft and gingival index scores were higher in males than females. The mean DMFT+dmft index score was found to be highest in the 6-8 years of age group followed by 8-10 years of age group and lowest in the 10-12 years of age group. The reverse findings were observed with regard to the mean gingival index score, the highest being in the 10-12 years of age group and the lowest in the 6-8 years of age group. All the results were statistically insignificant with a p-value of not less than 0.05. **Conclusion:** In this study, the oral health of children was found to be relatively good. It can be said that organizations play a crucial role in maintaining the oral health of such children by arranging regular dental health education and check-up programmes.

KEYWORDS: Dental caries, Gingivitis, Hearing and speech-impaired children, Organizations

INTRODUCTION

Oral health constitutes a necessary part of general health which plays an important role in the life of human beings.[1] Good oral health is important for mastication, esthetics, phonetics, etc. Hence it is very necessary to safeguard the oral health of all children otherwise, poor oral health will result in dental diseases like dental caries, periodontal diseases, etc. which adversely affects the overall health.[2]

Dental caries is an infectious disease which is chronic, resulting due to microbial acid production which causes dissolution of tooth structure leading to demineralization and ultimately cavitations.[3] Gingivitis is one of the most common periodontal conditions occurring due to poor oral hygiene caused by a variety of factors such as bacterial plaque, alterations in the immunologic or hormonal systems, various systemic diseases, etc.[4, 5]

Most disabled individuals begin their life with teeth and gums that are as strong and healthy as those of normal people. However, their diet, eating patterns, medications, physical limitations, lack of cleaning ability and attitudes of parents/guardians and health care providers towards them become a potential cause of poor oral health.[6]

Hearing and speech-impaired children constitute one of the major groups of disabled children whose oral health needs are very often neglected.[7,8] Hence there is a need for exploring the oral health status of these children and providing the appropriate treatment measures for this stratum of the society.

Numerous studies have shown that differently abled children had more dental diseases and unattended dental problems as compared to normal children.[9] There is no published data regarding the oral health status of deaf and mute children in Gujarati population. Therefore, the present study was carried out with the aim of determining the prevalence of dental caries and gingival diseases in these children. This will help to promote their health status and to plan appropriate oral health interventions.

MATERIALS AND METHODS

This study was undertaken after obtaining ethical clearance from Ethical Committee of Government Dental

College and Hospital, Ahmedabad, Gujarat, India. It involved 100 hearing and speech-impaired institutionalized children of age group 6–12 years who were examined for caries and gingival health status. The examination included children from 3 different institutions of Ahmedabad city.

Dental caries was measured with the help of DMFT index and gingival disease measured with the Loe and Silness Gingival Index. The indices were recorded using mouth mirror, explorer and periodontal probe in normal daylight, each examination taking around 5 to 10 minutes. A record of all the indices was maintained for each child examined to arrive at the final conclusion. Informed consent was taken from the managing authority of the institution. Parents were telephonically informed about the screening procedure. Sign-language experts provided the required assistance if the children had any queries regarding the procedure. It was also informed that the children can refuse or withdraw from the study at any time. Only those children were included in whom institutions gave their consent to carry out the dental examination, whose parents were informed about the screening procedure and who were cooperative with no other systemic history. Children who were less than 6 years old and more than 12 years old, uncooperative children, mentally retarded children, children with systemic diseases and children with the presence of other disabilities were excluded from the study.

Statistical analysis of results was done with the help of ANOVA test and independent sample t-test, with the level of significance set at 0.05.

RESULTS

The result showed that the mean DMFT+dmft, as well as, the mean gingival index scores of the total sample were 3.21 and 0.69 respectively (Table 1, Figure 1). They were higher in case of males, being 3.29 (mean DMFT+dmft score) and 0.70 (mean gingival index score) as compared with females, having scores of 3.10 and 0.67 respectively. However, a large difference did not exist between their scores, indicating almost the same level of oral hygiene maintenance (Table 2 and 3, Figure 2 and 3).

Index scores		N	Mean	Std. Deviation
DMFT+dmft Index Score	Total	100	3.21	2.06
Gingival Index Score	Total	100	0.69	0.28

Table 1:Mean DMFT+dmft and gingival index scores of total sample

Sex		N	Mean	Std. Dev	Std. Err Mean	Mean Diff	P Val
DMFT + dmft Index Score	Male	58	3.29	2.21	0.290	.20	.638
	Female	42	3.10	1.86	0.287		

Table 2: Mean DMFT+dmft index scores of the gender group

Sex	N	Mean	Std. Dev	Std. Err Mean	Mean Diff	P Val
Ging. Index Score	Male	58	0.70	0.27	0.035	.03	.567
	Female	42	0.67	0.31	0.048		

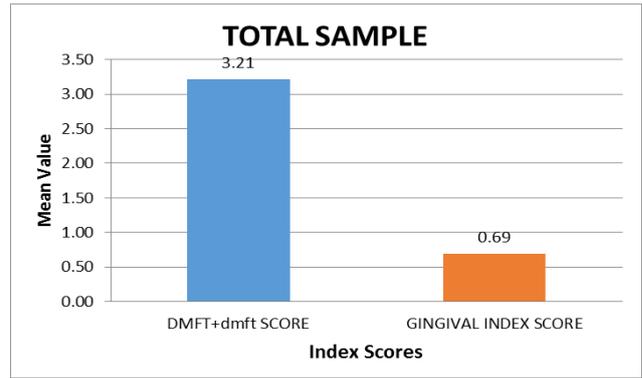Table 3: Mean gingival index scores of the gender group

Figure 1: Bar Diagram showing the mean value of DMFT+dmft and gingival index scores of the total sample of 100 children
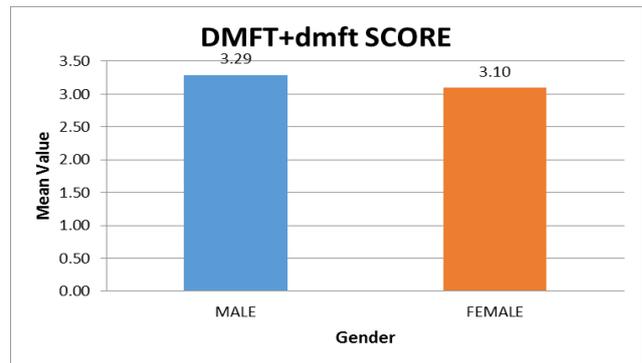

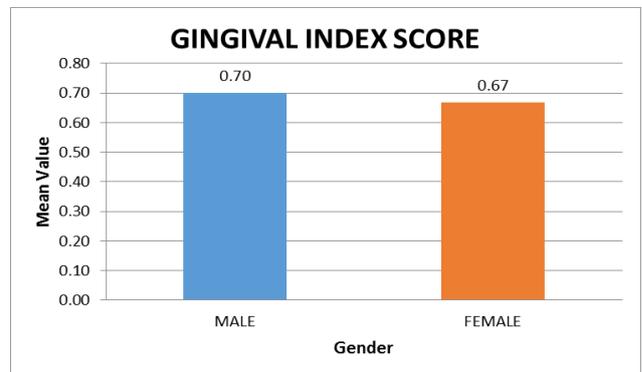Figure 2: Bar Diagram showing the mean DMFT+dmft index scores based on gender

Figure 3: Bar Diagram showing the mean gingival index scores based on gender

The mean DMFT+dmft index score was found to be highest in the 6-8 years of age group (3.97) followed by 8-10 years of age group (3.13) and lowest in the 10-12 years of age group (2.79) (Table 4, Figure 4). The reverse findings were observed with regard to the mean gingival index score, the highest being in the 10-12 years of age group (0.74), followed by 8-10 years of age group (0.67) and the lowest in the 6-8 years of age group (0.62) (Table 5, Figure 5).

All the results were statistically insignificant with a p-value of not less than 0.05, indicating that there is no statistically significant difference among the genders as well as the age groups. Such findings are also likely to be observed sometimes in case of normal, sensory abled children.

Age group	N		Mean	Std. Dev	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	ANOVA P Value
						Lower Bound	Upper Bound			
DMFT+ dmft Score	6-8	29	3.97	2.57	0.48	2.99	4.94	0.00	12.00	.051
	8-10	23	3.13	1.87	0.39	2.32	3.94	0.00	7.00	
	10-12	48	2.79	1.69	0.24	2.30	3.28	0.00	6.00	
	Total	100	3.21	2.06	0.21	2.80	3.62	0.00	12.00	

Table 4: Mean DMFT+dmft index scores of the age groups

Age group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	ANOVA P Value
					Lower Bound	Upper Bound			
Gingival Index Score	6-8	29	0.62	0.27	0.05	0.51	0.72	0.00	1.17	.181
	8-10	23	0.67	0.32	0.07	0.53	0.80	0.00	1.29	
	10-12	48	0.74	0.27	0.04	0.66	0.82	0.08	1.29	
	Total	100	0.69	0.28	0.03	0.63	0.74	0.00	1.29	

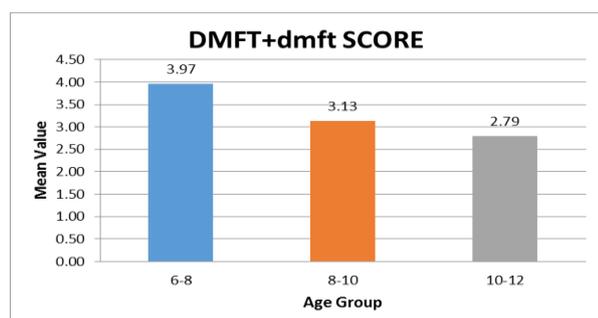Table 5: Mean gingival index scores of the age groups

Figure 4: Bar Diagram showing the mean DMFT+dmft index score based on age group
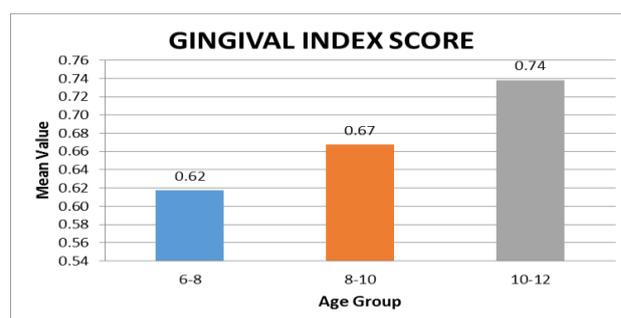

Figure 5: Bar Diagram showing the mean gingival index score based on age group

DISCUSSION

Although the disabled subjects have a right to the same standards of health care, like the general population has, it has been proved that that they show poorer general and oral health, and have unmet health needs and facilities with lower utilization of screening services. The improvement of the quality of life is the greatest contribution of dentistry for such individuals because most oral diseases and their consequences had an influence on daily normal life.[3] Dental caries and periodontal diseases constitute the most common oral health problems in differently-abled children, indicating a need to find out their occurrence in them.

Both DMFT index and Loe and Silness Gingival index are easy, simple and rapid methods of assessing the caries prevalence and the status of gingival health, requiring minimal instruments and can be examined under normal day-light. Also, the examination can be completed in less time. In this study, as many children were needed to be examined, DMFT and Loe and Silness gingival indices were the most appropriate.

When this study was undertaken, the prevalence of dental caries and gingival diseases was assumed to be high among the children. However, contradictory to these findings, the prevalences of both the diseases were found to be around the acceptable limit.

The mean DMFT+dmft score in this study was found to be 3.21 (Table 1). The DMFT+dmft score among males was 3.29, which was slightly higher than that among females at 3.10. Statistically, however, there was no significant difference (p value = 0.638) (Table 2). The results were similar to the results of the study conducted by Djeri et al. and Radman et al.[10], with no significant differences between the gender groups. The study conducted by Balwant Rai, et al.[11] and Hong Wei et al.[12] found that the mean DMFT score was 2.82 and 1.40, respectively.

In this study, the mean Loe & Silness gingival index score was 0.69 (Table 1). The score among males was found to be 0.70, and that among females, 0.67. But there was no statistically significant difference (p-value = 0.567) (Table 3). The study conducted by Al Maweri et al.[13] also found the mean Loe & Silness score among deaf and mute children to be 1.13, which was nearer to the findings obtained in this study.

In this study, the mean DMFT+dmft score was highest for the age group of 6-8 years (3.97) and lowest in the 10-12 years of age group (2.79) (Table 4). These findings were similar to the findings by Suma G et al.[14] which also showed a higher score for younger age group (0.42) as compared to the older age group (0.38). The reverse findings were observed with regard to the mean gingival index score, the highest being in the 10-12 years of age group (0.74), followed by 8-10 years of age group (0.67) and the lowest in the 6-8 years of age group (0.62) (Table 5). The high score in the 6-8 years of age group may be attributed to the lack of ability to follow oral hygiene instructions and tooth brushing method shown by the care-providers of the institution.

Results of the study by Shaw et al.[15] showed good oral hygiene in patients with hearing disability as compared to

other sensory disabled conditions. As per the study by Abhayjeet Singh et al.[16], the mean DMFT score was found to be 2.1 and 2.3 and deft 1.3 and 1.87 in deaf children and visually impaired children respectively, indicating a higher need for dental treatment in blind children. Al Qahtani and Wyne[17] also showed poor oral hygiene in blind and mentally retarded children as compared to deaf children. The result of this study was found to be same as that of Venkataraman Sanjay et al.[18] who showed a higher mean DMFT score (2.16) in blind children as compared to the hearing impaired where a lower score of 1.80 was observed.

In this study, the overall oral health status of deaf and mute children was relatively good. This was mainly due to the reason that this study was conducted in private institutions with a well-trained staff, capable of demonstrating appropriate oral hygiene procedures. Also, the children were subjected to regular dental check-up programmes. Dental caries was found to be low due to the fact that the children received drinking water with slightly higher than the optimal level of fluoride[19], and non-cariogenic, non-retentive diet under the surveillance of the institution. Also, no in-between meal snacks were given to the children. Low prevalence of gingival and periodontal diseases can be associated with a good level of training regarding the use of dentifrices, toothbrushes, and mouthwashes. Since the present study includes the minimum sample size, the scope for further in-depth research with a larger sample size might be explored in future.

CONCLUSION

From this study it can be concluded that the oral health of deaf and mute children was found to be relatively good, which can be attributed to the following:

- Regular dental health education programmes held by the institutions.
- Presence of higher than the optimal fluoride required.
- Absence of cariogenic substances in the diet of children.
- Availability of various oral hygiene aids.

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