An assessment of the effectiveness of oral health education on oral health-related knowledge and attitudes of caregivers of children with hearing impairment



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Abstract

Aim To assess the effectiveness of oral health education on oral health-related knowledge and attitudes of caregivers of children with hearing impairment and its impact on the oral health status of their children.

Materials and methods Study design: Non randomised pre- and post-comparison study. Fifty-six pairs of caregiver-child with sensory impairment were chosen and divided into study and control groups. Health education was provided to the caregivers of the study group for 1, 3, 6 and 12-month period and periodic assessment of their knowledge, attitudes and practices (KAP) was performed. The caregivers of the control group did not receive any oral health education during the study period. The oral health status of these children was evaluated using the WHO assessment form (2013) and modified OHI-S (oral hygiene index- simplified) at baseline, 6 month and 12-month period. The effectiveness of KAP of caregivers and the oral health status of their children was correlated at the end of the study. Statistical analysis: The mean KAP scores between caregivers' of study and control group at different time intervals was compared using repeated measures of ANOVA test. Chi square test was used to compare the presence of bleeding gums and Mann Whitney U Test was used to compare the mean DMFT, deft and OHIs scores at different time intervals between study and control groups. Pearson correlation test was used to assess the relationship between KAP scores and clinical parameters at different time intervals in study and control group of both the populations.

Results There was a significant increase in KAP in the study group caregivers along with improvement in the oral hygiene of their children at the end of the study. The control group scores for both caregivers and their children did not show any significant change.

Conclusion The oral health education given to the caregivers has shown a positive impact on the oral health status of their children. Periodic reinforcement of the oral health-related measures among caregivers of children with hearing impairment is recommended.

KEYWORDS Children with hearing impairment; Caregivers; Health education; Knowledge, attitudes and practices (KAP).

Introduction

Children with hearing impairment form a subset of those with special health care needs (SHCN). According to Indian Census Report (2011), 26.8 million people in India are suffering from some form of disability. Among them, the Hearing Impaired (HI) constitute 18.9% [Indian Census, 2011]. These children may be at an increased risk for oral diseases due to greater limitations in oral hygiene performance by virtue of their potential sensory deficits. This in turn can affect their quality of life. However, the oral health status of children with hearing impairment is similar to that of the general population [Avasthi et al., 2011].

Parents/caregivers are the principal decision makers in matters pertaining to the health of their children. Their oral health-related knowledge, attitudes and practices will influence their children's oral health behaviour, both in self care as well as in seeking professional care. Because of difficulty in communication, children with hearing impairment tend to be more socially isolated and require the help of their primary caregivers in order to communicate with the health care team.

Studies have shown that there is a lack of knowledge regarding oral health care including caries prevention practices, lack of motivation to seek treatment and the low priority given to oral health care in the society among caregivers of children with hearing impairment. The restricted ability of these children to respond to instructions and sometimes their inability to complain when there is discomfort results in progression of the disease process until it reaches a state of emergency [Khalaf et al., 2015; Al-kotb H et al., 2017].

There is a need to provide specific oral health education to parents/ caregivers of children with sensory impairment about oral health care that is appropriate to their needs and challenges. There is also a paucity of studies assessing the impact of oral health education of parents/caregivers on the oral health status of hearing impaired children. Thus, this study aims to assess the effectiveness of periodic oral health education with the help of a module on the oral health-related knowledge and attitudes of caregivers and its impact on the oral health status of their children with hearing impairment.

Group	Time	N	Mean	SD	F‡	P-Value
Study	Baseline	29	27.41	2.46	7.725	0.004*
	1 month	29	26.48	9.75		
	3 month	29	32.55	2.89		
	6 months	29	29.86	2.03		
	9 months	29	30.55	1.96		
	12 months	29	30.41	1.64		
Control	Baseline	28	29.43	4.29	7.041	<0.001*
	1 month	28	25.00	5.62		
	3 months	28	26.93	3.73		
	6 months	28	28.93	3.44		
	9 months	28	29.21	3.60		
	12 months	28	30.29	2.62		

TABLE 1 Comparison of mean KAP scores in time intervals among study and control groups using repeated measures of ANOVA test.

Statistically significant

Materials and methods

Materials

- Diagnostic instruments for oral examination (mouth mirror, dental explorer and CPI probe).
- Questionnaire to caregivers (knowledge and attitude assessment).
- Oral Health Education Module for Caregivers of children with hearing impairment. It consists of a visual instruction aid in the form of a pamphlet and a video lecture in the regional language.
- WHO Oral Health Survey Form [WHO, 2013].
- Modified OHI-S form [Rodrigues, 1989].

Case selection

Fifty-six children with hearing impairment (CHI) aged 5–15 years and their caregivers from R.V. Integrated School for the Disabled, Bangalore were selected for the study. Children with hearing impairment and their caregivers who had other concurrent developmental anomalies/syndromes, suffering from any systemic illnesses, with reduced manual dexterity in brushing and uncooperative ones were excluded during the selection process. The study protocol has been approved by the ethical committee of the college. Purpose of the study was explained to the children and their caregivers, and a voluntarily written informed parental consent was obtained.

The work was conducted at the DAPM RV Dental College and Hospital, Bangalore (India).

Method

The study was designed to be carried out over a span of 12 months with follow-up intervals at 1 month, 3 months, 6 months and 12 months. Children and their respective caregivers were randomly divided into 2 groups, study and control, with 28 subjects in each group. The oral health education was given in the form of a power-point presentation to the caregivers only. The study group constituted those caregivers who had obtained oral health education module with appropriate adjunctive tools to assist their hearing impaired children in oral health maintenance. The control group constituted those caregivers who had not obtained any intervention. The tools given were a videotape and pamphlet containing the oral hygiene instructions for the children. Oral health-related knowledge and attitudes of all the caregivers was assessed using a 25-item questionnaire which was administered to them in their language of convenience (English and Kannada) at all the follow up intervals.

Oral health examination of all the 56 children (study and control) was done using WHO oral health assessment form and modified OHI-S forms. The WHO assessment for gingival bleeding was done using CPI probe and the OHI-S scoring was done using a dental explorer.

Data collection

At baseline, 1 month, 3 months, 6 months and 12 months, the caregivers were given questionnaires to assess their KAP. Only the caregivers of the study group were given oral health education at each time interval. The oral health status of their children was assessed at baseline, 6 months and 12 months. All these data were further statistically analysed.

Results

The mean KAP scores of the caregivers between the study and control groups were statistically analysed using repeated measures of ANOVA test (Table 1). The scores in the study group showed a statistically significant increase (p=0.004) from baseline to 3 months, 6 months and 12 months. While, the control group showed statistically significant decline in the scores from baseline to 1 month which further increased

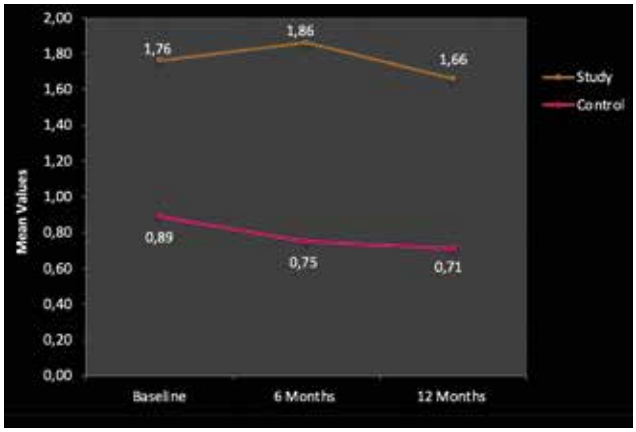


FIG. 1 Comparison of mean DMFT scores between time intervals within study and control groups.

Variables	Categories	Study		Control		χ2 Value	P-Value
		n	%	n	%		
Baseline	No	11	37.9%	9	32.1%	0.210	0.65
	Yes	18	62.1%	19	67.9%		
6 months	No	15	51.7%	14	50.0%	0.017	0.90
	Yes	14	48.3%	14	50.0%		
12 months	No	15	51.7%	13	46.4%	0.160	0.69
	Yes	14	48.3%	15	53.6%		

TABLE 2 Comparison of gingival bleeding scores in study and control groups using Chi square test.

*Statistically significant

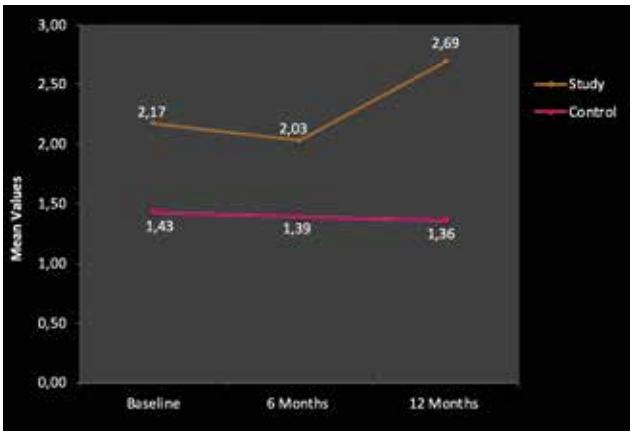


FIG. 2 Comparison of mean deft scores between time intervals within study and control groups.

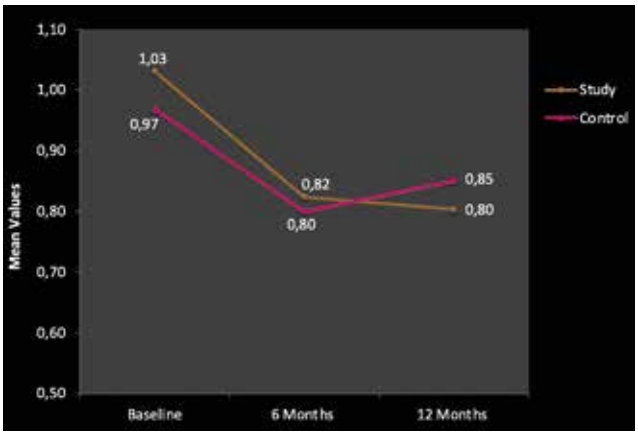


FIG. 3 Comparison of mean OHIs scores between time intervals within study and control groups.

at 6 months and 12 months.

The gingival bleeding scores of the children of study and control group was compared using Chi square test (Table 2). While the study group showed a reduction, though not statistically significant, in gingival bleeding scores from baseline to 12 months, the control group showed no statistically significant difference over the timeline. Similarly, a comparison of DMFT, deft and OHI-S scores at different time intervals between study and control groups was done using Mann Whitney U test. The DMFT and deft scores in the study and control groups have not shown any statistically significant difference from baseline to 12 months (Fig. 1, 2). However, the OHI-S scores have shown a statistically significant reduction in both study and control groups from baseline to 6 months (p=0.03) and also from 6 months to 12 months (p=0.01) (Fig. 3).

The relationship between KAP of caregivers and clinical parameters of their children was assessed using Pearson correlation test (Table 3). At baseline, the KAP scores of caregivers revealed a very weak negative correlation with DMFT (-0.09), a very weak positive correlation with deft (0.04) and a weak positive correlation with OHI-S (0.26). The KAP scores at 6 months revealed a weak negative correlation with DMFT (-0.32), a weak positive correlation with deft (0.62) and a weak positive correlation with OHI-S (0.15). However the correlation between KAP scores and deft was statistically significant (p<0.001). The KAP scores at 12 months revealed a very weak negative correlation with DMFT (-0.08) as well as deft (-0.16) and a very weak positive correlation with OHI-S (0.04). The relationship between KAP scores and the oral

	Group	Variables	Values	DMFT	deft	OHIs
Baseline	Study	KAP	r	-0.09	0.04	0.26
			P-Value	0.65	0.83	0.18
	Control	KAP	r	0.08	-0.24	0.17
			P-Value	0.70	0.23	0.38
6 months	Study	KAP	r	-0.32	0.62	0.15
			P-Value	0.09	<0.001*	0.45
	Control	KAP	r	0.13	-0.30	0.09
			P-Value	0.53	0.12	0.67
12 months	Study	KAP	r	-0.08	-0.16	0.04
			P-Value	0.70	0.40	0.84
	Control	KAP	r	0.29	0.04	0.16
			P-Value	0.13	0.85	0.40

TABLE 3 Pearson correlation test to assess the relationship between KAP scores and clinical parameters among study and control groups.

*Statistically significant

health scores in the control group revealed no statistically significant correlation as reflected in DMFT/deft and OHI-S scores at baseline, 6 months and 12 months.

Discussion

Parents/caregivers play a major role in maintaining the health of their children through appropriate primary preventive and seeking secondary interceptive care. Parents of children with hearing impairment (CHI) require oral health education in order to help them take care of their wards. These children are relatively capable of self-maintenance when compared to other sensory deficits. Improper communication with the health care team due to difficulty in perceiving and responding to oral health instructions leads to lower utilisation of health care services [Singh et al., 2014]. The caregivers' knowledge and attitudes (KA) are highly associated with the oral health behaviour of their disabled children [Liu et al., 2010]. Studies have shown that oral hygiene in these children can be significantly improved by providing intensified daily brushing by dental personnel, by the development of self-help workshops, by providing effective staff training, or by a combination of all these [Sandeep et al., 2014]. Also, periodic reinforcement of such information among the caregivers is necessary to bring about any significant change in the attitudes and practices of their children. This was demonstrated by a study that showed the need for periodic education of these children through educational media for maintenance of good oral hygiene [Arunakul et al., 2012]. Therefore this study provided a specific oral health education to the caregivers.

This effectiveness of an oral health education module given at regular intervals (1, 3, 6 and 12 months) on the oral health-related knowledge and attitudes of caregivers was assessed and its effect on the oral health status of their children as reflected in their DMFT/deft scores, gingival bleeding score and OHI-S scores. The oral health status of children aged 5–15 years was assessed periodically at baseline, 6 months and 12 months using World Health Organization Oral Health Assessment Form for Children (2013) and modified OHI-S form.

In this study the oral health education was given only to the caregivers of the study group. This was in order to improve their knowledge regarding basic oral hygiene practices with periodic reinforcement so that they in turn could improve the oral hygiene practices of their children. The oral health education module provided to caregivers targeted the core areas of oral hygiene maintenance. It consisted of knowledge about Fone's brushing technique and the use of additional dental aids such as dental floss, interdental brushes and mouthwash. The module also covered aspects regarding diet, dental caries as well as the treatment options available to help the parents make informed choices with regard to their child's food habits and to encourage them to seek treatment whenever necessary. The module also included various aspects of trauma management and the need for regular dental visits was also stressed upon. Additionally, the caregivers of the study group were provided with a visual aid for their hearing impaired wards in order to assist the children in their daily oral hygiene maintenance programme as was reported by a previous study [Arunakul et al., 2012].

In the study group, the increase in mean KAP scores from baseline to 12 months was statistically significant. This can be attributed to the periodic reinforcement of the oral health education to the caregivers. However, the control group mean KAP scores showed statistically significant reduction from baseline to 12 months, which could be because of absence of any oral health education programme to the caregivers. The mean KAP scores of both study and control group at the end of 12 months is almost the same, which is due to considerably good KAP value of the control group caregivers at baseline itself. Also, the gradual improvement in the KAP scores in the control group could be attributed to a possible interaction between the study and control group caregivers as they were from the same institution. For this reason, it has been recommended that the study and control groups should be kept in isolation as there is always a risk of their cross interaction [Kumar, 2013].

The clinical parameters assessed in these children included the DMFT/deft, bleeding gums and OHI-S. The mean DMFT and deft scores in study group at baseline were 1.76 and 2.17 respectively which remained the same over the 12 month period. These values have been found to be lower than those reported in unimpaired children [Kundu et al., 2015].

The study group children showed a statistically significant reduction in their OHI-S score from baseline (1.03) to 6 months (0.82) and remained the same at 12 months (0.80). This reflects sustained efforts by the caregivers towards maintaining their child's oral hygiene. The control group also showed a statistically significant reduction in OHI-S scores over the timeline, which can be explained by the increase in KAP of their caregivers which has been been explained earlier. A study was conducted to assess the dental health outcomes among institutionalised hearing impaired children following supervised tooth brushing by their caregivers showed significant reduction in plaque and gingival scores and thus an active involvement of parents and caregivers was recommended as an important principle of oral health education [Parrek et al., 2015].

The hearing impaired study group of children showed a reduction of gingival bleeding scores from baseline to 6 months which remained the same at 12 months. This difference was not statistically significant. The gingival bleeding score in the control group showed an initial reduction by 6 months but later increased by 12 months. This can be explained by the motivation and sustained efforts by the caregivers of the study group who obtained periodic oral health education and additional visual aid to improve their child's oral health status [Arunakul et al., 2012].

The KAP scores of caregivers and oral health status of children when compared showed a weak correlation between the variables in both study and control groups at various time intervals, neither of them being statistically significant. This could be because of certain amount of deficit in transference of information from parents to the children as elder children are less dependent on their caregivers and also are capable of self-maintenance in basic activities. This could also indicate a need for addressing both the caregivers and the children together during the oral health education which is in accordance with a study that evaluated the impact of oral health education intervention on the plaque scores among hearing impaired children [Alse et al., 2015]. Thus, an effective oral health education module that helps the caregivers overcome the obstacles in basic oral hygiene maintenance in their hearing impaired children should be provided on a periodic basis. Health education module should be primarily aimed at both the parent/caregiver as well as the child to avoid any barriers of communication. Programmes directed towards these goals are highly recommended.

Conclusion

Within the limitations of the present study, we conclude the following.

The oral health-related knowledge, attitude and practice (KAP) scores of caregivers of children with hearing impairment (CHI) post intervention, using oral health education module, has shown an improvement over the study time period.

The oral health status of children with hearing impairment, whose caregivers obtained health education periodically, showed a significant improvement over the 12 months period.

The child-caregiver pairs of the control group did not show any significant improvement in the results from baseline to 12 months.

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