

Full Length Research Paper

Tangible incentive for promotion of oral hygiene in elementary pupils

Seyed Ebrahim Jabarifar^{1*}, Parvin Khadem², Maryam Rismanbaf³ and Firoozeh Nilchian³

¹Hezarjerib Avenue, Isfahan University of Medical Sciences, Isfahan Dental School, Isfahan, Iran.

²Khorasgan Dental School, Isfahan, Iran.

³Isfahan Dental School, Isfahan, Iran.

Accepted 25 July, 2011

The aim of this study was to assess the influence of tangible incentive on oral hygiene task in fifth grade elementary pupils. 33 school students were included in this study and were divided into two groups. The Simplified Oral Hygiene Index (OHI-S) was measured in both groups at T₀ (baseline), T₁ (initial), T_S (second) and T_T (third) stages. Those in the first group (Case group) were awarded, if they achieved low levels of OHI-S index after brushing of teeth. However, the control group was not awarded. The mean and standard deviation and percentage of changes of OHI-S score in the two groups were described and analyzed by t-test, ANOVA and Chi-square. The mean OHI-S score significantly decreased in the case group while the percentage change of this score increased in this group of students. This study indicated that oral hygiene program instruction supplemented with promising incentive can effectively improve tooth brushing performance in school children.

Key words: Oral hygiene, students, motivation, incentive, oral hygiene.

INTRODUCTION

The efficiency of oral hygiene depends on the frequency, precision and timing of daily tooth brushing, proper brushing technique and motivation for this task (Danial and Harfst, 2000). The cohesive, mature and microbial dental plaque is a critical origin of dental caries and periodontal disease. Daily oral hygiene practices and adoption to them plays preventive role and also promotes public dental health (Daly et al., 2003). Learning brushing techniques and adopting to oral hygiene in early life course guarantees the effectiveness of these practices in preventing major dental and periodontal disease in one's lifetime. It is reported that majority of school pupils in developing countries do not brush their teeth or do not know proper brushing techniques ((Fjellstrom et al., 2010; Harikiran et al., 2008). Oral hygiene instruction, creating motivations in child health care programs and continuous consultation in different times promote knowledge, attitude and behavior related to oral health (KAP-Related Dental Health) (Al-Sharbaty et al., 2000). Self- practice efficacy is determined as an efficient oral hygiene

(Honkala et al., 1989). Oral and dental diseases have negative impact on the nutrition, sleep, growth, play, rest, learning and quality of life of children (Efe et al., 2007; Dorri et al., 2009).

Oral hygiene practices, integrated into the general hygiene routines in family environment settings, school and training institutes, are more effective than other settings (Kuusela et al., 1997; Kowash et al., 2000). Oral hygiene practices influence external, social and environmental forces, peer pressure, sib modeling and internal driving competing forces (Leal et al., 2002; Sheiham, 1984). Oral hygiene education via direct repeated verbal oral hygiene instruction or strict lecturing is monotonous and could be too tedious for the children. Therefore, oral hygiene training should be supplemented with positive reinforcements and modification techniques, such as involving in games or competitions, giving of awards, including motivators and using of attractive environment (Kakudate et al., 2009; Levin and Currie, 2010). Conrado and Kay reported that if children start daily brushing at early ages, they will be dental caries free at higher ages (Conrado et al., 2004; Kay and Locker, 1998).

Different psycho-social strategies are implemented in carrying out dental hygiene training. Positive and

*Corresponding author. E-mail: Jabarifar@dnt.mui.ac.ir. Tel: +98 311 792 2858.

Table 1. OHI-S scores (Mean \pm SD) in the two groups at different stages of the study

Item	T ₀	T _I	T _S	T _T
Control	2.64 \pm 0.24	1.47 \pm 0.75	1.56 \pm 0.78	1.50 \pm 0.55
Case	2.44 \pm 0.44	0.52 \pm 0.40	0.78 \pm 0.55	0.68 \pm 0.53
P-value	(P=0.12)	(P<0.001)	(P=0.008)	(P=0.008)

objective incentives are examined. One of them includes giving of greater responsibility (Zaborskyte and Bendoraitiene, 2003). Despite the success made in oral health education in public health context, it still has weak relationship with dental caries (Doherty et al., 2008; Farias et al., 2009). The knowledge, attitude, practice model is challenged by ignorance and lack of or low attention to social, environmental and political issues related to dental disease. Recent approaches to health education are improved by health promotion concept and losing victim-blaming doctrine (Martens et al., 1973; Ghasemi et al., 2009).

Swain et al. (1982) observed that good tooth brushing game in children promoted oral hygiene in school pupils. Ferrazzano et al. (2008) also reported that children were given an award for cleaning their teeth well and the plaque index was decreased. Rodrigues et al. (2009) concluded that smiling robot, and macro model slides were significantly decreased. O; Leary plaque index (OPI) and smiling robot were the best outcomes. Conrado et al. (2004) pointed out that presenting oral hygiene instructions to mothers of the school children intensified school-based oral health promotion effects, because the mothers (as models or motivators) encouraged pupils. Farias et al. (2009) expressed that contextualized oral health education in school programs positively reinforced oral hygiene instructions. The purpose of this study was to evaluate the effect of a tangible incentive on Simplified Oral Hygiene Index (OHI-S) in fifth grade elementary students in Khorasgan area in Isfahan Province of Iran.

METHODOLOGY

Consecutive convenience sample of thirty-three fifth grade elementary pupils from a school in Khorasgan area of Isfahan was used in this study. The study population was divided into two clusters. The age of students was about ten years old.

This study was approved by the ethical committee of Free Islamic University of Khorasgan. Written consent was obtained from the children's parents, the head teacher and other administrators of the school. Inclusion criteria were: Ten years old pupils with proper general health status, formal education level (fifth grade), committed to taking part in all steps of the study, having sound teeth index (upper first permanent, lower first permanent, upper central incisor, lower first lateral incisor teeth).

Exclusion criteria were: Those students without dental caries and tooth filling and hypoplasia or anomalies in the index teeth. All students received three sessions of didactic and practical oral hygiene instructions. Teaching lessons were performed with lecture, demonstration on a head marquette and giving out color picture

pamphlet and puppet models. The contents of oral hygiene sessions were tooth brushing techniques, disclosing tablet and sixteen steps manipulating brush movements in different tooth surfaces and areas.

$$\begin{array}{r|l} 6, 1 & 6 \\ \hline 6 & 1, 6 \end{array}$$

[OHI-S index, use of chewing disclosing tablet and oral hygiene instruction were piloted for five students. A pupil was trained and calibrated in validating measures, blinding two groups of OHI-S].

A tooth brush and fluoride tooth paste kit (Oral B, stage 4) were used during this study. Disclosing tablet was chewed at base line time (T₀), 48 h (T_I), one month (T_S) and two months (T_T), followed by tooth brushing. OHI-S (Green / Vermillion¹) was assessed at each time. We applied OHI-S (Debris Index) in buccal and lingual surface of index teeth.

The OHI-S scoring system was: 0= without debris; 1= one-third of the tooth surface covered with debris; 2= more than one-third and less than two-third of the tooth surface covered with debris; 3= more than two-third of the tooth surface covered with debris. The average OHI-S scores of each participant were calculated by dividing the total scores into six. None of the students received any prize at the base line (T₀). An award (fancy eraser and pencil kit) was offered to the case group in three stages: T_{Initial}, T_{Second} and T_{Third}, if the OHI-S scores were decreased. But no present was offered to control group [Pupils are not used in minor stages: T₀, T_I, T_S, and T_T stages of the study].

The data were recorded in four steps. The standard deviation and means of OHI-S score were calculated and descriptive and analytic statistics of the two groups were provided by t-Test, ANOVA and chi-square test utilizing SPSS software (11.5).

RESULT

A total of thirty-three fifth grade elementary pupils (18 girls, 15 boys) participated in this study. The mean and standard deviation of OHI-S score at T₀ in case and control groups were 2.44 \pm 0.44 and 2.64 \pm 0.24 respectively. This difference was not significant (P=0.12).

On the other hand, the difference of mean of OHI-S score and average percentage changes in two groups in T_I, T_S, T_T stages were significant (Tables 1, 2 and Figure 1).

DISCUSSION

Oral hygiene education supplemented with positive motivations should be started at early ages in order to obtain

Table 2. OHI-S score changes in the two groups at different stages of the study.

Item	T _I (%)	T _S (%)	T _T (%)	P
Control	44.3	40.8	40.4	<0.05
Case	70.8	60.8	70.2	<0.05

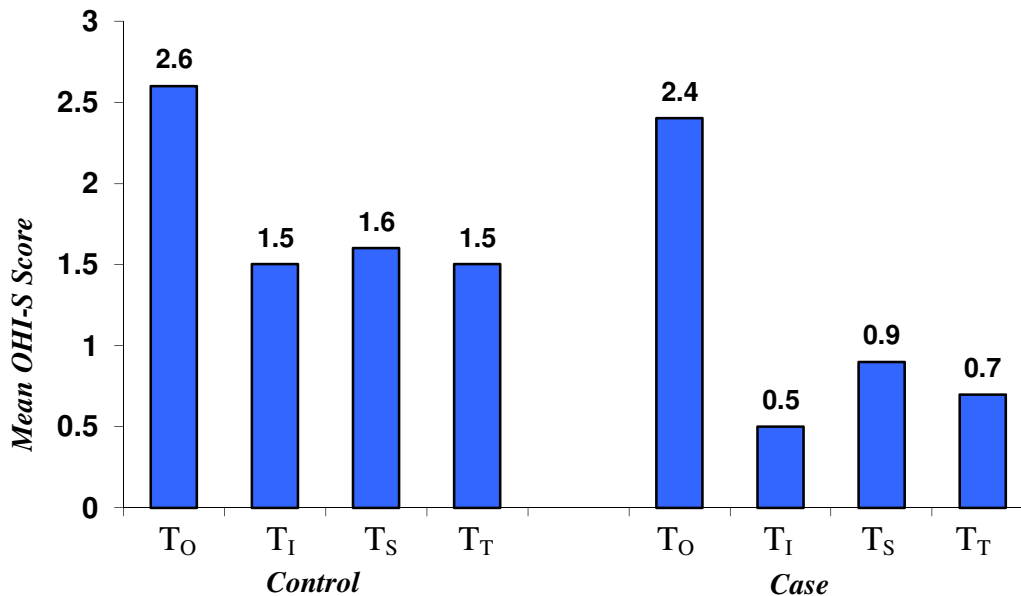


Figure 1. Distribution of Means of OHI-S in case-control subjects

expected outcomes and oral hygiene experts should utilize appropriate promoting methods which are compatible with the target clients.

In the case study group, OHI-S is significantly decreased at forty-eight hours, one month and two month periods after awarding compared to control group. The decrease of OHI-S score in case group was significantly higher than the control group.

Kowash et al. (2000) reported that regular home visit of mothers to their infants, with passing of oral hygiene instruction is effective in preventing occurrence of dental caries in babies. The findings of this study are similar to ours.

Another finding in our study was that OHI-S score was also decreased in the control group. This may have occurred as a result of practicing oral hygiene techniques in home, oral hygiene instruction and Hawthorne effect. Kay and Locker (1998) reported oral hygiene has short term effect on dental plaque, oral debris, malodor, gingival index, knowledge, attitude, practice-related oral health, but it has no long term outcomes such as prevalence and incidence of dental caries and periodontal disease. The finding of our result with its short comings is as reported by Kay and Locker (1998).

Hekimian and Manesh (1979) reported that positive incentive (game, contest) is supporting good flossing

habit in children’.

In a similar study of ours, Swain et al. (1982) reported that a good tooth brushing game increased the effect of pupils’ oral hygiene skills by decreasing OHI-S score. In co-directing with present study, Ferrazzano et al. (2008) reported that prize was effective in establishing good oral health and cleaning of the pupil’s tooth in primary, mixed and permanent dentition. Our assumption is that offering tangible incentives affects brushing techniques and the frequencies and correctness of tooth brushing task.

In every follow-up, we observed improvement in cleaning of teeth; it is shown that pupils in case group have more incentive than control (without award). Rodriguez et al. (2003, 2009) reported that indirect instruction with smiling robot, class presentation and direct instruction with macro models, and all the motivation methods promoted significant decrease of visible dental plaque (VPI). The results of our study confirmed findings of Rodriguez et al. (2003, 2009).

Conclusion

The average difference and means of OHI-S score in case groups were lower than control group in the three stages of the study. These findings demonstrate the

promising effect of award giving to school pupil which indirectly improved oral hygiene. Other studies with larger sample size, different age groups and long term follow up are needed to support our findings.

ACKNOWLEDGEMENTS

We would like to thank the Vice Chancellor of Research of Khorasgan Dental School, Islamic Azad University. We are also grateful to parents and students who participated in this study.

REFERENCES

- Al-Sharbaty MM, Median TM, Sudani O (2000). Oral health practice and dental caries among Libyan pupils. *East. Mediterr. Health J.*, 6(56): 997-1007.
- Conrado AC, Machiel MS, Oliveira MR (2004). A school –based oral health educational program. *J. Appl. Oral Sci.*, 12(1): 27-33.
- Daly B, Watt R, Batchlor P (2003). *Essential Dental Public Health*. Oxford University Press, pp. 115-180.
- Danial SJ, Harfst S (2000). *Dental Hygiene*. Mosby Co., pp. 120-140.
- Doherty AS, Ross A, Bennet R (2008). The Oral Hygiene performance Test; Developing and Validation of Dental Dexterity Scale. *Spec. Care Dent.*, 14(4): 144-152.
- Dorri M, Sheiham A, Watt RG (2009). Relationship between general hygiene behavior and oral hygiene in Iranian adolescent. *Eur. J. Oral Sci.*, 117: 407-412.
- Efe E, Sarvan S, Kukula K (2007). Self reported knowledge and behavior related to oral and dental health in Turkish children. *Comp. Pediatr. Nurs.*, 30(4): 133-46.
- Farias AI, Souza ACG, Ferriera FAM (2009). A Health Education Program for Brazilian Public School Children: The effect on Dental Health Practice and Oral Health Awareness. *J. Public Health Dent.*, 69(4): 22-300.
- Ferrazzano GF, Cantile T, Sangiantoni, Ingenito A (2008). Effectiveness of a Motivation Method on the Oral Hygiene of Children. *Eur. Paediatr. Dent.*, 9(4): 183-187.
- Fjellstrom M, Yakob M, Soder BA (2010). Modified Cognitive behavioral model as a method to improve adherence to oral hygiene instructions. *Int. J. Dent. Hyg.*, 8:178-182.
- Ghasemi TD, Jabarifar DE, Ketabi M (2009). Effect of Tooth Brushing Time on Plaque Index in First Grade Pupils of Isfahan. *Isfahan Dent. School J.*, 6(2): 20-24.
- Harikiran AG, Pallavi SK, Sapna H, Ashoutosh, NKS (2008). Oral Health –related KAP among 11-to 12 years old school children in a government aided missionary of Bangalore City of Indian. *J. Dent. Res.*, 19(3): 236-242.
- Hekimian C, Manesh BA (1979). A System for Positive Reinforcement of Good Flossing Habits for Children. [http://www.priory.com/dent/flossing/ pp 1-3](http://www.priory.com/dent/flossing/pp1-3).
- Honkala E, Nyysönen V, Knuttila M, Markanen M (1989). Effectiveness of Children's Habitual Tooth Brushing. *J. Clin. Periodontol.*, 13(1): 81-85.
- Kakudate N, Morita M, Sugai M, Kawan M (2009). Systematic cognitive behavior approach for oral hygiene instruction. *Patient Educ. Couns.*, 74(2): 191-196.
- Kay E, Locker DA (1998). Systematic Review of Effectiveness of Health Promotion Aimed to at Improving Oral Health. *Community Dental Health*, 15(3): 132-144.
- Kowash MB, Pinfield A, Smith J, Curzon MEJ (2009). Effectiveness on oral health: A long term health education program for mothers with young children. *Br. Dent. J.*, 188(4): 201-205.
- Kuusela H, Kannas L, Tynjala J, Wold B (1997). Hygiene habits of 11 year old school children in 22 European countries. *J. Dent. Res.*, 76(9): 16-29.
- Leal CS, Bezerra BCA, Teledo AO (2002). Effectiveness of teaching method for toothbrushing in preschool children. *Braz. Dent. J.*, 13(2): 133-136.
- Levin KA, Currie C (2010). Adolescent Toothbrushing and the Home Environment: Socio-demographic factors, family relationship and mealtime routines and organization. *Community Dent. Oral Epidemiol.*, 38: 10-18.
- Martens LV, Frazier JP, Hirt JK, Meskin HL (1973). Developing bBrushing Performance in Second Graders Through Behavior Modification. *Health Serv. Rep.* 88(9): 818-823.
- Rodrigues JA, Dos Santos PA, Corona SA, Palma-Dibb RG, Garcia PP, Baseggio W (2009). Oral Hygiene Indirect Instruction and Periodic Reinforcement: Effects on Plaque Index in School Children. *J. Clin. Pediatr. Dent.*, 34(1): 31- 34.
- Rodrigues JA, Santos DPA, Garcia PPNS, Corona SAM, Loffredo LCM (2003). Evaluation of Motivation Methods Used to Obtain Appropriate Oral Hygiene Levels in School Children. *Int. J. Dent. Hyg.*, 1: 227-232.
- Sheiham A (1984). Changing Trends in dental caries. *Int. J. Epidemiol.*, 13(2): 142-147.
- Swain JJ, Allord BG, Holborn WS (1982). The Good Tooth Brushing Program for Increasing the Tooth Brushing Effectiveness of Children. *J. Appl. Behav. Anal.*, 15: 171-176.
- Zaborskyte A, Bendoraitiene E (2003). Oral Hygiene Habits and Complaints of Gum Bleeding among Lithuanian School Children. *Stomatologia*, 5(1): 31-36.