

# Effectiveness of Parental Participation in a Dental Health Program on the Oral Health Status of 8–10-year-old School Children

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## ABSTRACT

**Aim:** Prevention-focused school dental health program (SDHP) is a cost-effective intervention that countries can use to lessen the problem of dental diseases by educating on oral health. The current study aims to assess the effectiveness of parental participation in an SDHP held at periodic intervals on the oral health status (OHS) of children aged 8–10 years attending a local school in Southern India.

**Materials and methods:** The longitudinal study was scheduled between September 2018 and June 2019 (36 weeks) in 120 participants who were healthy school children aged 8–10 years at a private school in Kelambakkam. This 36-week duration study assessed the effectiveness of school dental health education program with and without parents at every 12 weeks interval. The OHS of subjects was assessed using the standard indices [i.e., Decayed, Missing and Filled permanent teeth (DMFT), decayed, extracted, and filled primary teeth (def), and Simplified Oral Hygiene Index (OHI-S)]. Friedman's test and Mann–Whitney *U* test were used for analyzing the data as indicated.

**Results:** In postintervention visits, children with parental participation had significantly lower caries increments than children without parental participation. While the oral hygiene index scores have improved significantly in both groups over time, the improvement in the parental participation group was greater.

**Conclusion:** It can be concluded that the SDHP is an educational driver that showed a constructive impression on the oral health of children. The participation of the child's parents in SDHP has significantly improved the OHS of children.

**Keywords:** Dental health education, Oral health status, Parents, School dental program.

*International Journal of Clinical Pediatric Dentistry* (2022): 10.5005/jp-journals-10005-2411

## INTRODUCTION

Oral disease, particularly dental caries, poses a major health burden in children and can have an impact on their life, inflicting pain, discomfort, and disfigurement. Dental caries is multifactorial in nature and affects the entire population regardless of gender, age, or socioeconomic status.<sup>1</sup> According to WHO data, the frequency of occurrence of dental caries in a child ranges from 49 to 83.4% in primary dentition and from 41.9 to 69.4% in permanent dentition across different countries.<sup>2</sup> The pooled prevalence in Indian children is reported to be 58.3% between 2012 and 2016.<sup>1</sup> This indicates a fairly greater prevalence (of dental caries) as compared to the target advocated by WHO for the year 2000 (i.e., half of those in the age group of 5–6 years must be caries-free).<sup>3</sup> The negligence of dental health among Indians is the conjoint reason for the increasing prevalence and caries severity.<sup>4</sup> The gaps in knowledge and awareness of good oral hygiene practices, fear of dental treatment, and affordability are some other attributable causes of increased dental caries in the Indian subcontinent.<sup>5</sup>

Regular dental care is based on specific treatments, and rehabilitation showed only a limited impact on the oral health of the population. India's large population size and limited manpower make this approach impractical and questionable in terms of effectiveness. Instead, addressing these issues at the primary level of prevention would be efficient and cost-effective, reducing the need for remedial treatment and requiring limited manpower and materials.<sup>6</sup>

A school-based dental health education program is a preventive strategy aimed at improving oral/dental health status during the school years, and motivating to maintain

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**How to cite this article:** Sowmiya Sree RA, Joe Louis C, Senthil Eagappan AR, *et al.* Effectiveness of Parental Participation in a Dental Health Program on the Oral Health Status of 8–10-year-old School Children. *Int J Clin Pediatr Dent* 2022;15(4):417–421.

**Source of support:** Nil

**Conflict of interest:** None

best practices even after schooling. Appropriate guidance on oral hygiene is vital for growing children and schools are the best centers for effective implementation of dental health promotion programs because they are easily accessible to children.<sup>7</sup> Furthermore, children are more receptive and information on health promotion can be delivered and nurtured, thereby allowing them to develop good dental health behaviors that last a lifetime.<sup>8</sup>

The best way to promote oral hygiene in young children is through an SDHP which includes a close association between teachers, parents, and dental professionals. These programs may help to increase school teachers' knowledge of oral health, and they can collaborate with dental professionals to promote oral health concepts and good hygienic skills in children. This, in turn, can enhance their dental health and general wellness.<sup>9</sup>

Young children are greatly influenced by their parents. Therefore, improving parents' oral health knowledge through an SDHP can minimize their children's risk of dental caries. Ideally, parents' tutoring should go hand in hand with children's training pertaining to the importance of dental health and best oral hygiene practices. This way parents can learn to improve their oral health and simultaneously educate their own children.<sup>10</sup>

This current study is aimed to assess the effectiveness of an SDHP given at periodic intermissions and the effect of parental participation on the dental health status of children aged 8–10 years attending local schools in Southern India.

## MATERIALS AND METHODS

A longitudinal study was implemented from September 2018 to June 2019 (36 weeks). The study was permitted to be conducted by the Ethics Committee of Chettinad Academy of Research and Education, Kelambakkam, Tamil Nadu (Reference number: 347/IHEC/10-17). The school was selected on the criteria of proximity. Official approval from the in-charges of the school was taken after explaining the objectives of the study. Healthy school children, 8–10 years of age of both genders were included in this study. Children with chronic illness, on long-term medications, children using orthodontic appliances, siblings already enrolled in the study, and children with disability were excluded. Written Informed consent was acquired from the parents before the commencement of the study.

The sample comprised 120 healthy children from the fourth and fifth grades. Each grade had two sections and one section of each grade was randomly assigned to group I ( $n = 60$ ), in which only the children participated in the dental health education program. The other section of each grade was included in group II ( $n = 60$ ) where parents participated in the program along with their children. The baseline clinical examination was done in the school by a well-trained, calibrated child dental specialist, from the parent institute. The dental caries status and oral hygiene status of each child were recorded in the proforma.

- Dental caries assessment was carried out using deft for primary dentition<sup>11</sup> and DMFT index as per standards.<sup>12</sup>
- Simplified Oral Hygiene Index was used to determine oral hygiene status.<sup>13</sup>

After baseline examination, dental health education was provided to the participants of both groups, teachers of all the classes, and parents of group II through audio-visual aids. This included an interactive session for 30 minutes focusing on a wide range of topics, including, functions of teeth, types of dentition and their significance, common oral diseases and their clinical manifestations, dietary instructions, oral hygiene instructions, injurious oral habits, prevention of dental diseases, treatment modalities, and importance of visiting dentists regularly. Also, the correct brushing technique was demonstrated with the help of typodont models, and children were encouraged to practice on the models. Similar toothbrushes (soft) and fluoride toothpastes were distributed to all the children and they were asked to use the same throughout the study. Teachers were encouraged to demonstrate the brushing technique to children once every fortnight in both groups. In group II, parents were asked to help their children with their new oral hygiene habits at home. Instruction booklets comprising dietary instructions, oral hygienic practices, and brushing technique was handed over to both teachers and parents for reference. This dental health education program was repeated at the 12th, 24th,

and 36th weeks' follow-up visits to all the study participants, and children were examined for their caries status and oral hygiene status. Data obtained during these consequent visits were recorded and analyzed using the Friedman's test (longitudinal analysis) and Mann–Whitney  $U$  test (intergroup comparisons).

## RESULTS

The present study was conducted on 120 school children between the age of 8 and 10 years and their demographic details are depicted in Table 1. The changes in the DMFT index scores from baseline to weeks 12, 24, and 36 for both groups are shown in Table 2. There was a considerable increase in the DMFT index from baseline to the 36th week ( $0.27 \pm 0.686$  initially to  $0.57 \pm 0.81$  by 36 weeks;  $p < 0.001$ ) in group I. However, in group II, the baseline mean DMFT was  $0.25 \pm 0.680$  which remained unchanged until the 24th week, then raised to  $0.30 \pm 0.696$  by the 36th week [the changes were significant ( $p = 0.029$ )].

The differences in the deft index scores from baseline to weeks 12, 24, and 36 for both groups are shown in Table 3. The baseline mean deft index score for group I was  $1.80 \pm 2.114$ , which statistically significantly raised to  $2.53 \pm 2.054$  by the 36th week ( $p < 0.001$ ). The mean deft index score in group II also showed a statistically noteworthy change from  $1.23 \pm 1.430$  at baseline to  $1.52 \pm 1.513$  by the 36th week ( $p < 0.001$ ).

Table 4 shows that the mean value of the OHI-S index was  $1.265 \pm 0.642$  at baseline and  $1.082 \pm 0.338$  at the end of the 36th week in group I. The corresponding scores for group II were  $1.405 \pm 0.635$  at baseline and  $0.537 \pm 0.370$  at the end of 36th week. Oral hygiene index scores significantly improved over the time period in both groups ( $p < 0.001$ ).

Intergroup analysis (Table 5) performed via the Mann–Whitney  $U$  test did not show statistically signifying variations ( $p > 0.05$ ) for the DMFT, deft, and OHI-S scores at the baseline. The DMFT and deft scores of group II were noted to be considerably inferior to those of group I at the 24th and 36th weeks' follow-up visits ( $p < 0.05$ ). Mean OHI-S scores in group II were significantly lower than those of group I at the 12th, 24th, and 36th weeks' follow-up visits.

The difference in the DMFT, deft, and OHI-S index values from baseline to 36th week was calculated and was compared for intergroup variations (Table 6). Comparing groups I and II, group I reported a greater increase in carious lesions than group II, whereas group II experienced a considerably better improvement in OHI-S scores.

## DISCUSSION

Oral diseases are very common in developing countries and are reflected to be a public health burden owing to their physical, social, emotional, and economic consequences.<sup>14</sup> Many oral health diseases are preventable and reversible in the early stages. Nevertheless, a large number of children and their parents are not sufficiently aware of the causes and prevention of oral diseases.<sup>15</sup> In many developed and developing countries, oral

Table 1: Demographic data

	Group I Without parents (N = 60)	Group II With parents (N = 60)
Male:female ratio	50:50	50:50
Age (range)	$8.75 \pm 0.571$ (8–10)	$8.82 \pm 0.431$ (8–10)

**Table 2:** Comparison of mean DMFT score between baseline and after dental health education

Groups	Weeks	Mean rank	Mean	SD	p-value
Group I (without parents)	DMFT baseline	2.21	0.27	0.686	<0.001*
	DMFT 12th week	2.31	0.32	0.725	
	DMFT 24th week	2.68	0.50	0.813	
	DMFT 36th week	2.81	0.57	0.810	
Group II (with parents)	DMFT baseline	2.48	0.25	0.680	0.029*
	DMFT 12th week	2.48	0.25	0.680	
	DMFT 24th week	2.48	0.25	0.680	
	DMFT 36th week	2.58	0.30	0.696	

\*Statistically significant

**Table 3:** Comparison of mean deft score between baseline and after dental health education

Groups	Weeks	Mean rank	Mean	SD	p-value
Group I (without parents)	deft baseline	1.71	1.80	2.114	<0.001*
	deft 12th week	2.03	1.97	2.147	
	deft 24th week	3.12	2.52	2.071	
	deft 36th week	3.15	2.53	2.054	
Group II (with parents)	deft baseline	2.26	1.23	1.430	<0.001*
	deft 12th week	2.26	1.23	1.430	
	deft 24th week	2.68	1.45	1.443	
	deft 36th week	2.80	1.52	1.513	

\*Statistically significant

**Table 4:** Comparison of OHI-S index score between baseline and after dental health education

Groups	Weeks	Mean rank	Mean	SD	p-value
Group I (without parents)	OHI-S baseline	3.34	1.265	0.642	<0.001*
	OHI-S 12th week	1.28	0.658	0.328	
	OHI-S 24th week	2.41	0.972	0.341	
	OHI-S 36th week	2.98	1.082	0.338	
Group II (with parents)	OHI-S baseline	3.93	1.405	0.635	<0.001*
	OHI-S 12th week	1.57	0.408	0.304	
	OHI-S 24th week	2.18	0.517	0.338	
	OHI-S 36th week	2.33	0.537	0.370	

\*Statistically significant

health education for school children by SDHP is shown to be effective in taming the awareness, and behaviors pertaining to oral/dental health.<sup>16-19</sup>

Health education can help improve the level of and change attitudes and beliefs. Health promotion programs provide appropriate information about dental care, including health care practices and attitudes not only to schoolchildren but also to their parents. Awakening the family's commitment to the well-being of family members, and guiding them to lead a healthy lifestyle is reported to have a significant effect on their lives and the overall family's OHS.<sup>20</sup> Parents, more so, when the mother participates in an educational health care program and is encouraged to develop healthy behaviors, is reported to bring down the incidence of caries in her child.<sup>21</sup> Organizing SDHP with parents warrants long-term welfare.

In the current study, we found that children in group I whose parents did not participate in the school dental health program had a greater increase in carious lesions during the postintervention visits than children in group II whose parents participated. While both the groups showed significant improvement in oral hygiene status after dental health education, the children with their parents in group II performed significantly better than children in group I, whose parents did not participate. This implies a positive association between parental participation in school dental health education program and OHS of children. The reason for the better OHS among children in the active parental participation group might be attributed to the parent's better awareness of oral health behaviors and their augmented ability to supervise best dental hygiene practices among their children. Parents may act as role models or verbally encourage their ward so that it endorses positive behavioral changes propagated at school.

**Table 5:** Intergroup comparison of mean DMFT, deft, and OHI-S index scores

Variables	Group I (without parents)		Group II (with parents)		“z” statistic	p-value
	Mean	SD	Mean	SD		
DMFT baseline	0.27	0.686	0.25	0.680	-0.23	0.815
DMFT 12th week	0.32	0.725	0.25	0.680	-0.69	0.485
DMFT 24th week	0.50	0.813	0.25	0.680	-0.24	0.013*
DMFT 36th week	0.57	0.810	0.30	0.696	-3.10	0.002*
deft baseline	1.80	2.114	1.23	1.430	-1.24	0.213
deft 12th week	1.97	2.147	1.23	1.430	-1.85	0.064
deft 24th week	2.52	2.071	1.45	1.443	-2.96	0.003*
deft 36th week	2.53	2.054	1.52	1.513	-2.85	0.004*
OHI-S baseline	1.265	0.642	1.405	0.635	-0.38	0.700
OHI-S 12th week	0.658	0.328	0.408	0.304	-4.06	<0.001*
OHI-S 24th week	0.972	0.341	0.517	0.338	-6.27	<0.001*
OHI-S 36th week	1.082	0.338	0.537	0.370	-6.89	<0.001*

\*Statistically significant

**Table 6:** Descriptive statistics of the change in variables score from baseline to 36th week

Variables	Group I (without parents)		Group II (with parents)		“z” statistic	p-value
	Mean	SD	Mean	SD		
DMFT (36th week–baseline)	0.30	0.462	0.05	0.219	-4.58	<0.001*
deft (36th week–baseline)	0.73	0.482	0.28	0.490	-4.71	<0.001*
OHI-S (baseline–36th week)	0.18	0.488	0.868	0.508	-6.53	<0.001*

\*Statistically significant

This finding is in line with Lee who in his study had reported that parental participation in SDHP showed considerably better enhancements in oral health.<sup>22</sup> Likewise, another similar study conducted in Europe, had reported that a parent’s affirmative participation and backing in SDHP was correlated with lower caries experience in children.<sup>23</sup> Similarly, a report from the United States by Howenstein et al. has reported authoritative parenting to be shielding against dental caries in children aged 3–6 years.<sup>24</sup>

On the contrary, Matsuyama et al. reported that poor contribution and absence of regulation of child’s health behaviors were correlated with the raised frequency of dental caries and deprived OHS among 6–7 years old Japanese children.<sup>25</sup>

In summary, the study reveals that the group with both the parental and children training had better oral health as compared to the group where only the children received training. Thus, parents may play a key role in establishing good oral hygiene practices in children. The basis for the founding of strong permanent teeth is laid down in the early years of life. Unhealthy dietary practices and the absence of brushing in the first 2 years of life are linked to dental caries. Furthermore, dental caries in the primary dentition raises the chance of dental caries in the succeeding teeth. Parents can play a key role in serving as a model for children to develop good oral hygiene practices and can play a vital role in making the children comprehend the importance of oral hygiene. Parents must regulate their child’s OHS by overseeing the brushing practices until the stage of changing dentition, that is, the eruption of the second molars or until they develop sufficient motor skills that allow them to appropriately perform oral hygiene maintenance self-reliantly.

The current study aimed at school children in the age range of 8–10 years. As early childhood caries can occur during the early

childhood years, and oral habits and behaviors are formed during the early years of life, future studies may also target kindergarten children. As the majority of the population in India still resides in rural areas, with low maternal education and limited access to specialized dental care, it would be interesting to examine the efficiency of a parent/guardian involved in SDHP in rural areas.

## CONCLUSION

This study showed that an SDHP had a constructive outcome on children’s OHS and awareness of dental hygiene practices. The benefits of such programs can be maximized with the regular involvement of school personnel, children, and their parents. Dental health education aimed at both the parents and children may show a superior enhancement in children’s OHS, as opposed to instructing health education without parental participation. Given the lack of parental awareness and lack of conjoint participation in dental health care programs in India, there is a need to include several dental awareness programs aimed specifically toward parents.

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## REFERENCES

1. Mehta A. Trends in dental caries in Indian children for the past 25 years. *Indian J Dent Res* 2018;29(3):323–328. DOI: 10.4103/ijdr.IJDR\_615\_17
2. Frencken JE, Sharma P, Stenhouse L, et al. Global epidemiology of dental caries and severe periodontitis—a comprehensive

- review. *J Clin Periodontol* 2017;44(Suppl 18):S94–S105. DOI: 10.1111/jcpe.12677
3. Aggeryd T. Goals for oral health in the year 2000: cooperation between WHO, FDI and the national dental associations. *Int Dent J* 1983;33(1):55–59.
  4. Aparna M, Sreekumar S, Thomas T, et al. Assessment of dental caries experience among 5 to 16-year-old school going children of Mangalore, Karnataka, India: a cross-sectional study. *Ann Essences Dent* 2018;10(1):12–17. DOI: 10.24105/aedj.2018.10.2
  5. Salunke S, Shah V, Ostbye T, et al. Prevalence of dental caries, oral health awareness and treatment-seeking behavior of elderly population in rural Maharashtra. *Indian J Dent Res* 2019;30(3):332–336. DOI: 10.4103/ijdr.IJDR\_356\_17
  6. Naidu J, Nandlal B. Evaluation of the effectiveness of a primary preventive dental health education programme implemented through school teachers for primary school children in Mysore city. *J Int Soc Prevent Community Dent* 2017;7(2):82–89. DOI: 10.4103/jispcd.JISPCD\_326\_16
  7. Shwethashree M, George PS, Prakash B, et al. Prevalence of oral diseases among school children of Mysuru and Chamarajanagar districts, Karnataka, India. *Clin Epidemiol Glob Health* 2020;8(3):725–727. DOI: 10.1016/j.cegh.2020.01.009
  8. Mangalore S, Venkata PKV, Basavantappa JS, et al. Knowledge about prevention of oral cancer and gum disease among school teachers in Dharwad, India. *Indian J Dent Res* 2013;24(3):279–283. DOI: 10.4103/0970-9290.117986
  9. Kay EJ, Baba SP. Designing dental health education materials for schoolteachers: formative evaluation research. *J Clin Pediatr Dent* 1991;15(3):195–198.
  10. Hanganu C, Dănilă I, Bârlean L, et al. School-based dental health considerations for program development. *Oral Health Dent Manage Black Sea Countr* 2004;3(3):4–10.
  11. Gruebbel AO. A measurement of dental caries prevalence and treatment service for deciduous teeth. *J Dent Res* 1944;23(3):163–168. DOI: 10.1177/00220345440230030201
  12. Klien H, Palmer CE, Knutson JW. Dental status and dental needs of elementary school children. *Public Health Rep* 1938;53(19):751–765. DOI: 10.2307/4582532
  13. Green JC, Vermillion JR. The simplified oral hygiene index. *J Am Dent Assoc* 1964;68:7–13. DOI: 10.14219/jada.archive.1964.0034
  14. Smyth E, Caamaño F, Fernández-Riveiro P. Oral health knowledge, attitudes and practice in 12-year-old schoolchildren. *Med Oral Patol Oral Cir Bucal* 2007;12(8):E614–E620.
  15. Alrmaly BA, Assery MK. Need of oral health promotion through schools among developing countries. *J Int Oral Health* 2018;10(1):1–3. DOI: 10.4103/jioh.jioh\_242\_17
  16. Alsumait A, ElSalhy M, Behzadi S, et al. Impact evaluation of a school-based oral health program: Kuwait National Program. *BMC Oral Health* 2019;19(1):202. DOI: 10.1186/s12903-019-0895-1
  17. Esfahanizadeh N. Dental health education programme for 6-year-olds: a cluster randomised controlled trial. *Eur J Paediatr Dent* 2011;12(3):167–170.
  18. Hartono SWA, Lambri SE, van Palenstein Helderma WH. Effectiveness of primary school-based oral health education in West Java, Indonesia. *Int Dent J* 2002;52(3):137–143. DOI: 10.1111/j.1875-595x.2002.tb00618.x
  19. Yang Y-H, Sue R-L, Warnakulasuriya S. Promoting better oral health practices among aboriginal Taiwanese adolescents: a school based oral health education intervention program. *J Health Care Poor Underserved* 2009;20(4 Suppl):41–50. DOI: 10.1353/hpu.0.0220
  20. Monroy PG. The age-1 dental visit and the dental home; a model for early childhood caries prevention. *J Mich Dent Assoc* 2007;89(1):32, 34–36.
  21. Feldens CA, Kramer PF, Sequeira MC, et al. Maternal education is an independent determinant of cariogenic feeding practices in the first year of life. *Eur Arch Paediatr Dent* 2012;13(2):70–75. DOI: 10.1007/BF03262847
  22. Lee AJ. Parental attendance at a school dental program: its impact upon the dental behavior of the children. *J Sch Health* 1978;48(7):423–427. DOI: 10.1111/j.1746-1561.1978.tb05639.x
  23. Duijster D, de Jong-Lenters M, de Ruiter C, et al. Parental and family-related influences on dental caries in children of Dutch, Moroccan and Turkish origin. *Community Dent Oral Epidemiol* 2015;43(2):152–162. DOI: 10.1111/cdoe.12134
  24. Howenstein J, Kumar A, Casamassimo PS, et al. Correlating parenting styles with child behavior and caries. *Pediatr Dent* 2015;37(1):59–64.
  25. Matsuyama Y, Isumi A, Doi S, et al. Poor parenting behaviours and dental caries experience in 6- to 7-year-old children. *Community Dent Oral Epidemiol* 2020;48(6):493–500. DOI: 10.1111/cdoe.12561