



“EFFECTIVENESS OF SCHOOL DENTAL SCREENING, PARENTAL KNOWLEDGE AND HEALTH EDUCATION IN STIMULATING DENTAL ATTENDANCE AMONG 6-10 YEAR-OLD SCHOOL CHILDREN IN BANGALORE CITY- AN INTERVENTION STUDY”.

Dental Science

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ABSTRACT

Introduction: The objective of the study is to evaluate the effectiveness of school screening, parental knowledge and health education in stimulating dental attendance among 6 to 10 years old children.

Material and Methods: A randomized controlled trial was carried out, with a sample size of 155 in each group. The study was conducted over a period of 3 months, baseline clinical findings were assessed using dentition status and plaque index and knowledge of parents was evaluated using a questionnaire in both the groups. The study group participants received oral health education and educational leaflets were distributed to the parents. Further after 3 months, the post-intervention improvement was assessed as before. Statistical analyses were performed using SPSS version 22. Descriptive statistics, Chi-square test, paired t-test, Wilcoxon signed rank test was used to analyze the data.

Results: The overtime changes in oral health knowledge of parents were significantly different in the study group (p-value <0.001). Highly significant reduction in Plaque scores was reported in the study group compared to control group (p-value <0.001). Overall there were no significant differences in DMFT and dmft increments between the groups. The intervention was not effective at reducing the level of active caries and increasing attendance in the population under study.

Conclusion: Even though the intervention had positive effects on plaque score and on oral health knowledge of parents, but the rate of utilization was low. We need additional efforts addressing another individual, family, and community level factors to make such programs more fruitful.

KEYWORDS

child, control group, dentition, health behavior, health education, oral health, parents

I Introduction

The story of India is one of growth, gains, and gaps. With an economy that is going from strength to strength, benefiting from the demographic dividend of a young and growing workforce, this largest democracy of the world is also home to the largest number of children in the world. India is home to the largest number of children in the world, significantly larger than the number in China.[1]The children of today are the future of tomorrow; this powerful statement assumes special significance in our context as children comprise one third of the total population in the country.[2] However, even today, after six decades of independence and despite various initiatives both on the legal as well as policy and program levels, oral health is still neglected and remains a cause of concern in the country.

Poor oral health can have a detrimental effect on children's performance in school and their success in later life. Caries in children is the most common chronic childhood disease. In India, dental caries affects more than four-fifths of children (6-19years) and most decay is left untreated. At the global level, approximately 80% of children attend primary schools and 60% complete at least four years of education. Schools are microcosms of the larger community and acts as an important setting, offering an efficient and effective way to reach over 1 billion children worldwide and, through them, families and community members, and also provide excellent opportunities for integrating oral health into the curriculum that is acceptable, appropriate and effective The school years cover a period that runs from childhood to adolescence and are influential stages in one's lives when lifelong sustainable oral health-related behaviors, as well as beliefs and attitudes, are being developed. Children are particularly receptive during this period and the earlier the habits are established, the longer lasting the impact. Poor oral health in childhood often continues into adulthood, impacting on economic productivity and quality of life. [3,4,5]

World Health Organization stated that "Screening of teeth and mouth enables early detection and timely interventions towards oral diseases and conditions, leading to substantial cost savings." [6] The primary aim of the school dental screening is the detection of disease at a stage earlier than that at which the patient would normally present for treatment.[7] School dental screening has a clear role in identifying children with the untreated disease and encouraging them to seek dental care by informing them about their dental needs.[8] Children with dental problems are completely dependent on their parents, this is because the parents are the gatekeepers and are usually the primary decision-makers on matters affecting their children's health. Moreover, in everyday life, parents function as role models for their

children, and therefore, parents' own dental hygiene habits are very meaningful. Attempts to achieve the best oral health outcomes for children, parents should be considered as key persons in ensuring the well-being of young children. [9,10] The role of the parent's dental education is very important; the child who is more prone to caries it has seen that their household environment is not in a shape of proper oral health guidance and there is lower educational level of parents has been seen. In India, people encounter various obstacles in the utilization of dental services. These barriers can be removed by motivating people and making them aware of the oral health problems that remove anxiety and fear so that they develop a positive attitude towards dental treatment. It is suggested that mobile dental clinics, dental camps, and dental outreach programs could be solutions to spread awareness and disseminate treatment. [11,12]

Despite longevity of school dental screening and health education among school children, there has been a relatively little investigation into its effectiveness. [13] Hence, the present study is undertaken to evaluate the effectiveness of school screening, parental knowledge and health education in stimulating dental attendance among 6 to 10 years old children in Bangalore city.

II MATERIALS AND METHODS

A parallel randomized controlled trial was carried out to evaluate the effectiveness of school dental screening, parental knowledge and health education in stimulating dental attendance among 6 to 10 years old children.

II A. Sampling and sample size

According to the purview of Deputy Director of Public Instructions (DDPI), Bangalore city schools are divided into various zones; North zone South zone and Rural zone. North zone was selected for the study. As the schools in the north zone are further divided into government and private schools, only government schools were considered in the study as they share similar demographic characteristics. The 64 government schools in the north zone were then subjected to two-stage simple random sampling technique for selection of the schools. In the first stage four schools were selected by lottery method, and in the second stage, these schools were randomly assigned either to study or control group (two schools in each group). The sample size for the study was calculated using a test of differences in proportions and considering alpha and beta errors. Based on the results of the previous study on dental utilization which was 10% done by Hebbal M, Nagrajappa R, in the year 2004, and which is expected to increase by 10% in our experimental group. The sample size was estimated to be 160 subjects in each group [including 10% nonresponse bias] with a-

error considered at 5% & β -error considered at 20% (80% power for a two-sided test).

INCLUSION CRITERIA

- Children aged between 6 to 10 years.
- Children who are present on the day of examination.
- Children who get consent from their parents to participate in the study.

EXCLUSION CRITERIA

- Schools and school children not willing to participate were excluded
- Children diagnosed with fever and other systemic illness on the day of examination.

A Performa was used to record the data. It had five parts;

- Part one consisted of socio-demographic information such as name, age, gender and socio-economic status based on Kuppuswamy's scale.
- Part two consisted of a questionnaire regarding oral hygiene practices of the child.
- Part three consisted of a structured closed-ended questionnaire regarding knowledge of parents regarding oral health and dental caries.
- In part four, parents were asked to answer questions regarding utilization of dental services.
- In the fifth part, a Modified WHO Oral Health Assessment Form (1997) was used to record the Dentition status.

The questionnaire was translated from English to Kannada for the convenience and feasibility of the study.

Ethical clearance to conduct the study was obtained from the Institutional Review Board, M.R. Ambedkar dental college and hospital, Bangalore, before the commencement of the study.

Prior to the study, a written informed consent was also obtained from the parents/guardian of the child. To ensure intra-examiner consistency, the kappa coefficient value for intra-examiner reliability was 0.78. A pilot study was undertaken; based on the problems faced during pilot study corresponding changes were made and the questionnaire was tested for its reliability by Cronbach's alpha, $\alpha = 0.71$. The study was conducted from February 2015 to June 2015. Oral examinations were scheduled in the working hours; the study questionnaires were distributed to the parents through the school children and any further incongruity was solved individually by the examiner. After screening for the dentition status and treatment needs and plaque index of the children, for information of parents, an oral health check-up card was also given to the children for any possible dental treatment in both the group.

The intervention in the experimental group was given in the form of

- 1) Oral health education to the school children regarding importance of teeth, maintenance of oral hygiene and prevention of oral diseases and also
- 2) Oral Health Information leaflets for Parents was designed in Kannada and English which highlighted the importance of oral health and the commonly found oro-dental problems among the children and how they can be prevented was distributed to them.

Children in the control group received no intervention during the study period.

Emergency treatment was given to both the groups.

Further after 3 months, the same questionnaire was given to the parents, to assess post intervention improvement in oral health knowledge in both the groups and dentition status and plaque index was assessed as before. The information on the decayed, missing and filled teeth index was calculated from the dentition status and treatment need. Teeth were initially assessed for the presence of plaque using the criteria of Silness and Loe Plaque Index 1964 as a measure of oral hygiene. Prior to recording dental plaque, the child was asked to rinse thoroughly with plain water. If no plaque was detected visibly on a surface, a probe tip was run across the surface to ascertain its presence/absence. Six surfaces were scored with the Plaque Index (PI); 55/16 buccal, 51/11 labial, 65/26 buccal, 85/46 lingual, 71/31 labial and 75/36 lingual.

II B. STATISCALANALYSES

Statistical analyses were performed using the statistical package of social sciences software (SPSS version 22). Level of statistical significance was set at $P < 0.05$. Descriptive statistics were used for demographic details of the study population and oral hygiene practices, Chi-square test for comparing categorical variables; Differences in changes over-time within the groups were compared using paired t-test for mean scores and the mean difference in decayed, filled and missing tooth in permanent and deciduous tooth was compared using Wilcoxon signed rank test

III. RESULTS

Out of the total sample of 320 (160 in each group) students taken during baseline, only 310 students were available at follow up, with a dropout rate of 4.3%. Reason for loss to follow up included absence on the day of examination and moving to another school due to the migration of the participant. Thus, only 310 (155 in each group) participants were included for statistical purposes.

The mean age of the participant in the study and control group was 7.9 ± 1.3 and 7.9 ± 1.0 respectively. About 52.9% and 56.1% of children in study and control group were males whereas 47.1% and 43.9% were females respectively. Socioeconomic status was assessed by using the revised Kuppuswamy Scale. Majority of the participant belonged to the upper lower class, 52.3% and 47.7% in study and control group followed by lower middle class, 43.2%, and 47.7% respectively. At baseline, there was a good balance between the study and control group with respect to demographic profile.

At baseline when participants were questioned about methods and materials used for cleaning, almost all participants (100%) in the study group responded that they use toothbrush and 90.3% used toothpaste for cleaning their teeth, whereas in control group 98.7% of the participant used toothbrush and 89% used toothpaste for cleaning their teeth.

Post-intervention, at follow up almost 95% were using toothpaste in the study group, whereas in control group there were no gross changes observed.

When participants were questioned about the frequency of brushing there was an increment of 9% in the study group whereas in the control group there was no positive change observed. There was a positive change observed in the study group in context to brushing their teeth before going to bed and frequency of changing toothbrush.

The mean plaque score at baseline was 1.73 ± 0.50 and 1.75 ± 0.52 for the study and control group. There was a significant difference in plaque scores after the intervention in the study group participants (p -value < 0.001) whereas in the control group no significant changes were observed. (table 1, figure 1).

For statistical analysis regarding the knowledge about oral health, responses to the questions were recorded as correct or incorrect and each of the correct answers was given a score of 1 and the wrong answer score of 0 for the knowledge questions.

(Table 2, figure 2) The mean knowledge score at baseline was 4.7 ± 1.42 and 4.54 ± 1.40 for the study and control group and on follow up the scores were 7.31 ± 1.31 and 4.81 ± 1.47 respectively in study and control group. The overtime changes in oral health knowledge of parents were significantly different in the study group (p -value < 0.001) compared to control group where there was no statistically significant difference observed over time.

(Table 3) Responses of parents regarding utilization of dental services, about 14.3% and 17.7% of the parents stated that they visited the dentist in a period of less than 1 year. Almost 70% of the parents in both the group stated that the reason for visiting the dentist was only when their child was in pain. Almost 50% of the participants in both the groups stated that their child had never visited a dentist and reason for not visiting was expensive dental treatment followed by lack of time, fear, and about 15.5% in the study group and 23.7% in the control group felt that there is no need to visit a dentist until and unless child is in pain.

Table 4 presents the changes over time in dental caries occurrence for primary and permanent teeth. It is seen that as expected in this young

population having mixed dentition, with newly erupting first molars, the caries prevalence was initially low with DMFT compared to dmft. The mean DMFT at baseline was 0.89 and 0.92 in the study and control group and the mean dmft was 2.55 and 2.3 in the study group and control group respectively. In the study group, there was a significant difference seen overtime for a decayed and filled component of the permanent and deciduous dentition. For the control group, there was significant difference seen between the decayed and filled component in permanent dentition. For deciduous dentition, a significant difference was seen only for the filled component in the control group. It was observed that during the course of study no teeth were extracted due to decay in either group. Overall there were no significant differences in DMFT and dmft increments between the two groups

III.A. TABLES

Table 1 Comparison of mean plaque index score before and after the intervention in the study and control group.

MEAN PLAQUE INDEX SCORES	STUDY GROUP		CONTROL GROUP	
	MEAN ±SD	P VALUE [#]	MEAN ±SD	P VALUE [#]
At Baseline	1.73 ± 0.50	0.001	1.75 ± 0.52	0.53
At Follow Up	1.30 ± 0.40		1.73 ± 0.59	NS

P VALUE <0.001 highly statistically significant using paired t-test

Table 2 Comparison of overall knowledge scores of the parents before and after intervention in the study and control group.

KNOWLEDGE SCORES	Study group		Control group	
	MEAN ±SD	P VALUE [#]	MEAN ±SD	P VALUE [#]
At Baseline	4.7 ± 1.42	0.001	4.54 ± 1.40	N.S
At Follow Up	7.31 ± 1.31		4.81 ± 1.47	

PVALUE <0.001 highly significant using paired t-test.

Table 3 Distribution of Study and Control group school children according to responses by their parents to questions regarding utilization of dental services.

	STUDY GROUP (N%)	CONTROL GROUP (N%)
1. Did your child ever visited dentist		
• Yes	84 (54.20)	79(50.96)
• No	71(45.80)	76(49.04)
If Yes, when did he/she last visited the dentist?		
• Less than 1 year	12(14.3)	14(17.7)
• 1-2 years	20(23.80)	17(21.5)
• More than 2 years	52(61.90)	48(60.8)
Reason for the last visit		
• Regular check up	8(9.5)	5(6.3)
• Cleaning	4 (4.8)	7(8.9)
• Filling	5 (5.9)	4(5.06)
• Extraction	8 (9.5)	6(7.6)
• Pain	59(70.3)	57(72.2)
If No, the reason for not visiting the dentist.		
• Lack of time	19 (26.8)	19 (25)
• Dental treatment is expensive	21(29.6)	24(31.6)
• Not needed unless having pain	11(15.5)	18(23.7)
• Fear of dental procedures	13(18.3)	9(11.8)
• The dentist is at a long distance	7(9.8)	6 (7.9)
2. What do you do when your child experiences a toothache?		
• Go to a dentist	111(71.6)	117(75.5)
• Self-Medication	25(16.1)	29(18.7)
• Nothing	19(12.3)	9(5.8)

Table4 Comparison of mean decayed, missing and filled permanent teeth and deciduous teeth at baseline and follow up with the study and control group.

	STUDY GROUP			CONTROL GROUP		
	At baseline MEAN ± SD	At follow up MEAN ± SD	P value [#]	At baseline MEAN ± SD	At follow up MEAN ± SD	P value [#]
DT	0.77±1.13	0.72±1.07	0.03	0.80±0.79	0.77±0.78	0.04
MT	0.058±2.3	0.058±2.3	1.0	0.039±0.19	0.039±0.19	1.00

FT	0.06±0.27	0.12±0.34	0.003	0.06±0.29	0.09±0.3	0.046
DMFT	0.89±1.3	0.90±1.3	0.31	0.928±0.92	0.93±0.92	1.00
Dt	2.4±2.36	2.32±2.18	0.026	2.14±2.13	2.1±2.12	0.132
Mt	0.05±0.22	0.06±0.27	0.32	0.026±0.16	0.026±0.16	1.00
Ft	0.13±0.41	0.17±0.44	0.005	0.13±0.39	0.21±0.58	0.02
Dmft	2.55±2.52	2.56±2.54	0.157	2.30±2.25	2.31±2.25	0.16

p-value Significance level is 0.05, using Wilcoxon signed ranked test.

III B. FIGURES

Figure 1 Comparison of plaque scores in study and control group at baseline and at follow up

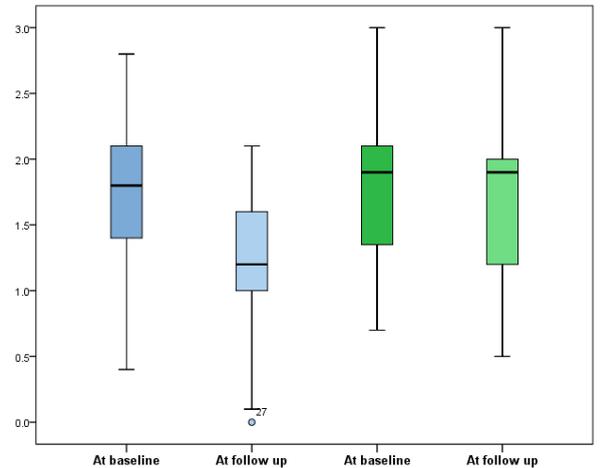
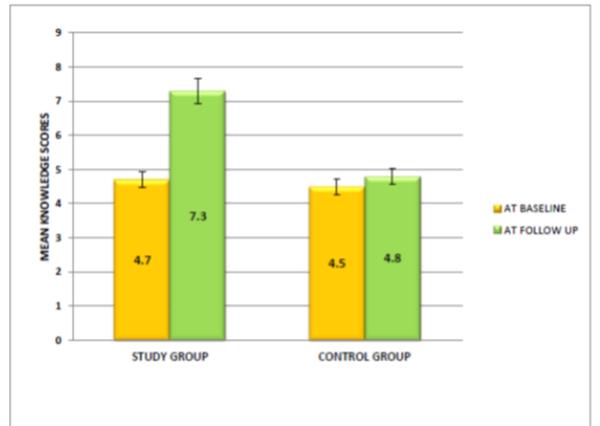


Figure 2, Comparison of mean knowledge scores in Study and control group at baseline and at follow up.



IV. DISCUSSIONS

To our knowledge, there are no Indian studies in literature conducted to evaluate the effectiveness of school dental screening combined with health education with a control group.

Oral conditions affect approximately 3.9 billion people globally. Untreated caries was the most prevalent condition followed by severe periodontitis. [14] Although dental caries prevalence has shown decline worldwide, oral health in many developing countries including India is still in compromising state, especially among children.[15] To add to the problem, the community oral health care delivery services in urban India are not sufficiently organized to successfully deliver curative services to this huge burden of oral diseases.

Dental screening at schools helps to identify normative dental treatment needs that are often not detected by the guardians. [16] It be an antidote to prevalent parental views about lack of need for preventive care or treatment of children's decayed, especially asymptomatic teeth. In addition, caries in permanent teeth in young children will usually be in the initial stages and may not cause discomfort to the child hence the Parents may be unaware of the treatment needs at this age. Therefore, screening for school children will help to identify those children at risk. [17] Even though there is no mandatory requirement for tracking and evaluation of children who

receive referrals. Such data are necessary to discern the effectiveness of school health programs to facilitate planning of feasible interventions to reduce disparities. It has been proposed that dental screening of children in their schools achieves the aim of "encouraging dental attendance and demand for care" and serves as "a means of dental health education." [18]

As observed in the previous studies most of the schoolchildren needing dental curative care were those living with families in worse economic and home environments, which highlight the importance of feasible community dental health programs to create mechanisms to improve access to and the use of dental services by those who most need them, thereby creating equity in access to health and not an "inverse care law" demand.[19] Systematic school-based oral health screening programs have not yet been established at the national level in India. Hence to implement such programs we the health professionals must evaluate these screening programs.

The expected benefits from the interventions are improved oral health knowledge, behaviors, and self-efficacy of parents in the short term. Long-term benefits expected are improved oral health status of children with reduction in dental disease experience and where treatment is required it will be minimal.[20]

Majority of the participants in our study belonged to the upper lower class in both study and the control group. Even though dental services generally do not deal with the social determinants of health that affect oral diseases, it is known they have an important impact on health inequalities. Occupational status, income, and education are intrinsically related and often serve as the measure for each-other. Socioeconomic inequalities in oral health are a major challenge not only because most of the inequalities can be considered unfair but also because reducing the burden of oral health problems in disadvantaged groups offers great potential for improving the average oral health status of the population. The latest data shows that children from deprived areas are much more likely to have signs of tooth decay. Children from less well-off backgrounds may have five times more tooth decay than those in the highest social classes. [21]

A high proportion of participants in both study and control group had correct knowledge and practice of using toothbrush and toothpaste to clean their teeth, similar findings were seen in the study conducted by Vyshalee L et al. [22] In the present study, school oral health interventions have been shown to improve oral health and oral health-related behavior among the participants who were given the intervention i.e. in the study group. shows that dental health education can be used as a potential tool in dental public health to promote oral health. [23]

Dental caries and periodontal diseases can be effectively prevented by plaque removal, which serves as a standard to evaluate oral hygiene. Oral health practices of school student's children have been said to 'reveal the nation's progress in promoting oral health.' [5] In the present study highly significant reduction in Plaque scores were reported in the study group where intervention was given. These findings are similar to the study done by Bal IS et al. [24] But are in disagreement to the study conducted in Tanzania, which showed that a school-based oral health educational program implemented did not result in significant reductions of the plaque scores.[25]

In order to help increase the health literacy, in our study health education pamphlets in the primary language (Kannada) were distributed in the study group and was found to have a significant effect on parent's knowledge compared to the control group. It is hypothesized that the effects on a child's oral health will be mediated through the primary caregiver. [26]

Parents/caregiver education has found to be significantly associated with a regular source of dental care, which in turn increase the likelihood of dental visits for low-income children.[19] The literature presents several suggestions to increase dental attendance for children. Tellen et al. pointed out that to encourage access to dental care for schoolchildren, it is necessary for parents the prime caregivers incorporate the value of preventive and curative dental care into their children's upbringing, especially in vulnerable populations. [27]

In our study, less than 20% of participant both in the study group and control group had visited the dentist in less than a 1-year span.

Evidence has shown that the availability of a regular source of dental care was a strong predictor of dental visits in the past 12 months, among persons in a vulnerable population. Thus, improving access to oral health services could allow standardization of the risk profile of children from different socio-demographic backgrounds and impact significantly on the percentage of children requiring urgent dental treatment, and on the number of decayed teeth in children at low-income schools.

Although the children in the study group were given the intervention along with screening and were urged to undergo the treatment, there was no difference in the response rate when compared to control group. Explanations for low utilization of dental services are complex and involve the interplay of many other factors including costs, the value placed on dental health, mother's educational level, ethnic grouping, and dental anxiety. Many of these factors have proven difficult to modify, and some authors advocate a sociopolitical approach. Parents will have to bear other expenditures such as the cost of transportation to receive the treatment, and they may prefer to not see their child absent from school to get the dental treatment, as appointments are scheduled during school hours only. Some parents were also concerned about quality of treatment given. [8,28,29]

V.CONFLICT OF INTEREST

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Competing interests: None declared.

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