

Impact of School Based Oral Health Education Programmes in India: A Systematic Review

RAMANDEEP SINGH GAMBHIR¹, RAMANDEEP KAUR SOHI², TARUN NANDA³, GURJASHAN SINGH SAWHNEY⁴, SANIYA SETIA⁵

ABSTRACT

The teaching of Oral Health Education aims at preventing the dental disease and promoting dental health at early stages. Schools are powerful places to shape the health, education and well-being of our children. The objective of this study was to determine the impact of school dental health education programmes conducted in various parts of India. A systematic review from available literature was carried out. The study examined papers relating to oral health interventions which were published between 1992 and 2012. Ten articles were selected and included in the review. All the studies were found to contain the required information on the outcomes of school dental health programmes in India. Different methods were used to deliver oral health education. All the studies reported significant improvement in oral hygiene of school children after imparting dental health education. In some studies, school teachers were also trained to impart oral health education. Decreased level of awareness was found in children coming from low income families. Longer duration studies are needed to improve the results. School dental education programmes should be more focused on north-eastern Indian population.

Keywords: Impact, School, Education, Programme, Dental

INTRODUCTION

Dental diseases are among the most common and widespread diseases around the globe. Poor oral health and untreated dental conditions can have a significant impact on the quality of life of children which may lead to overall deterioration of health [1]. The delay in treatment not only results in aggravation of disease, but also costs of care are substantially escalated as a consequence [2]. Children having poor oral health are 12 times more likely to have more restricted days, including missing school, than those who do not. Pain, discomfort, sleepless nights and time off school or work are the common problems for many children and adults. Each year, more than 50 million hours are lost from school due to oral diseases [3].

India, a developing country, faces many challenges in delivering oral health needs. In 1940, the prevalence of dental caries in 5 and 12 year old school children in India was 55.5% and it rose to 68% in the 1960s and climbed to 89% in the subsequent years [4-6]. The majority of the Indian population resides in rural areas and children more than 40% is constituted by children. These children cannot avail dental facilities due to inaccessibility, financial constraints and stagnation of public dental health care services and therefore are most vulnerable to dental diseases [7]. Though a National Health Policy for India has been drafted, no thought is being given to the national oral health policy at present by our policy makers. Schools are considered to provide the most favourable environment to impart oral health education to children. At the global level, approximately 80% of children attend primary schools and 60% complete at least four years of education, with wide variations between countries and gender. In some countries, more than 50% of children aged 7 to 14 years are out of school and less than 20% complete the first grade due to exploitation of child labour. Nonetheless, schools remain an important setting, offering an efficient and effective way to reach over 1 billion children worldwide and, through them, families and community members [8].

There is a dearth of published literature that demonstrates the impact and effectiveness of school-based dental health education (DHE) programmes in India and it is one of the most neglected

activities in the field of public health. Studies focusing on the impact have an important role in the further development of these kinds of interventions. Until and unless, the impact of a program on the targeted population is not determined, the success of the program cannot be assessed. Keeping this in mind, the present review was undertaken to determine the impact of school based dental health education programs in India and to create awareness among the planners to ensure long-term benefits.

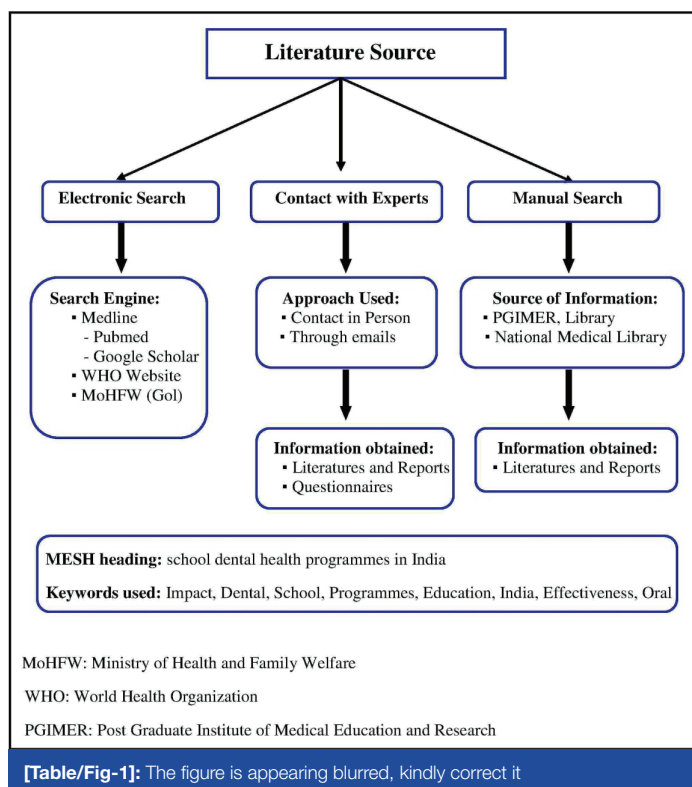
MATERIAL AND METHODS

Search Strategy

Review of literature was done both electronically and manually. Search strategy employed in the review of literature is depicted in [Table/Fig-1]. For electronic search, various scientific journals and web-based search engines were used for the literature related to impact and effectiveness of school dental health education programs in India. Emails were sent and personal visits to some of the authors were made in order to gather data for literature. Articles were manually retrieved from Tulsi Das Library of Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh and National Medical Library, New Delhi, India. Cross references of the relevant articles were also retrieved.

Inclusion and Exclusion criteria

The inclusion criteria for the present review were: studies conducted on the impact and effectiveness of school dental health education in India i.e. aged between 5-15 years, and articles published in English language were selected. The period which was limited from 1992 to 2012 since the first study which was conducted on the evaluation of oral health education programme in schools in India was in 1992. Electronic search for school dental health education programmes in India yielded 45 references of which 10 were retained. The studies described in the papers resulting from this search were subject to a preliminary review and the following were excluded: case reports or editorials; studies describing interventions which were not primarily dental health education; studies conducted on the curricula of



[Table/Fig-1]: The figure is appearing blurred, kindly correct it

dental schools; studies in which quantitative data on outcomes were not presented. Full text of these 10 references was retrieved by electronic and manual search from Tulsi Das Library, PGIMER and National Medical Library.

Control of Bias Assessment

Two reviewers were assigned the job of identification of bias within individual studies. Following issues were included in the risk of bias or quality assessment in the present systematic review: (1) completeness of reporting information regarding effectiveness of school dental health education programmes, (2) selective outcome

reporting, (3) choice of outcome measures (reduction in plaque, gingival and DMFT scores and improvement in knowledge and awareness), (4) type of intervention (5) study design, and (6) conflict of interest in the conduct of the study. An overall estimation of plausible risk of bias (low, moderate or high) was performed for each of the selected studies. When all criteria were met, the risk of bias was estimated as low.

Extraction of Data

Two of the authors (RSG and GSS) screened the shortlisted studies and independently categorized and extracted data from full text of the articles. Any kind of disagreement between the authors regarding the article screening and data extraction was sorted by other two authors (TN and SS). Results were assessed on the basis of increase in oral health knowledge, change in oral hygiene practices and attitudes before and after imparting oral health education among children.

RESULTS

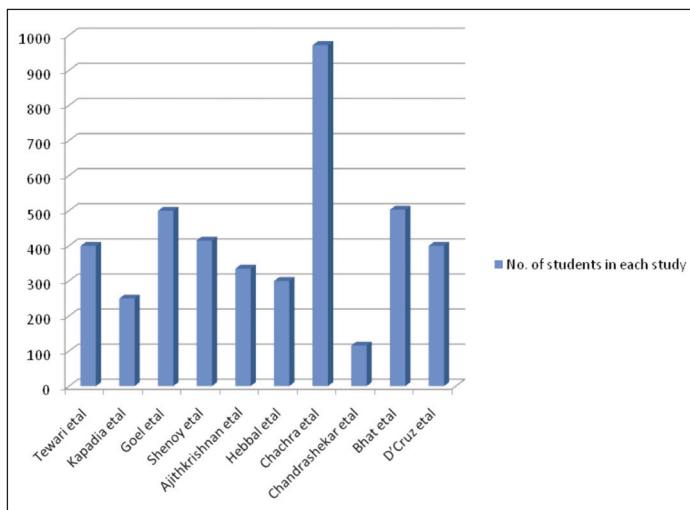
Ten articles were found to be relevant to the impact of school dental health education, and hence were included in the present review [9-18]. Data from all the 10 articles was critically analyzed to determine the impact and effectiveness of school dental health education programmes conducted in different parts of the country [Table/Fig-2].

Sample size of students enrolled in different studies is shown in [Table/Fig-3]. Study involving maximum no. of students was conducted by Chachra et al., [15] in which the authors involved 972 students in their study. In all the other studies, the final sample size of the study population was not more than 500.

The review comprised of eight published articles on clinical trials and a questionnaire to assess the oral health, knowledge and practices, two studies utilized only a questionnaire to determine the potential of school dental health education. Five of the studies were conducted in Southern India and one each was conducted in Haryana, Delhi, Gujarat, Chandigarh and Mumbai, India. Majority of the studies were carried out in school children belonging to 12-16 year age-

Authors	Year of Publication	Study Area	Study Population	Type of Intervention	Plaque/Gingival Scores	Dental Caries	Knowledge, Attitude & Practice
Tewari et al., [9]	1992	Ambala	5-16 year	Anganwadi workers, school teachers, professional instruction	-	-	Significant increase in brushing frequency
Kapadia et al.,[10]	1999	Mumbai	9 year	School teachers, professional instruction	Significant reductions in plaque	-	Significant increase in knowledge
Goel et al.,[11]	2005	New Delhi	10-13 year	Professional instruction, charts and models	-	-	Improvement in dental health awareness
Shenoy et al.,[12]	2010	Mangalore	12-13 year	Professional instruction, audio-visual aids	Highly significant reductions	-	Significant improvement
Ajithkrishnan et al.,[13]	2010	Vadodra	12-15 year	Professional instruction, models, charts and posters	Reduced plaque score but no reduction in gingival scores	No reduction in DMFT scores	-
Hebbal et al.,[14]	2011	Belgaum	12 year	Professional instruction, audiovisual aids, chalk and blackboard	Reduced scores	-	Increase in knowledge scores
Chachra et al.,[15]	2011	Chandigarh	5-16 year	Coloured albums, preventive package including fluoride, professional instruction	-	Highly significant reduction in DMFT and DMFS scores	Significant increase in oral health KAP
Chandrashekar et al., [16]	2012	Hyderabad	12-15 year	Professional instructors and school teachers, photos, brochures	Significant reductions	-	-
Bhat et al., [17]	2012	Bangalore	12-16 year	Power point presentations, professional instruction	-	-	Significant increase in oral health knowledge
D'Cruz et al., [18]	2012	Bangalore	13-15 year	Powerpoints and professional instructions	Significant reductions in both the scores	-	Improvement in oral hygiene knowledge

[Table/Fig-2]: Summary of studies depicting the impact of school dental health education programmes in India



[Table/Fig-3]: Sample size of students enrolled in different studies

group. Gingival and Plaque indices were used for assessing the oral hygiene of the children and caries status was based on DMFT and DMFS scores. Therefore, even though the studies were carried out in different time, the diagnostic criteria remained the same. In all the studies, the investigators were trained and calibrated in carrying out oro-dental examinations.

The analysis of all the studies indicated that knowledge, attitude and oral hygiene could be significantly improved through dental health education with all the 10 studies showing positive effects. Majority of the programmes which aimed to reduce plaque levels and improve gingival health were successful although there was no change in gingival scores and no reduction in caries increments in one of the studies that was conducted in Vadodra, Gujarat, India [13].

One of the studies found decreased level of awareness in children belonging to low socio-economic background (studying in government schools) as compared to children coming from high income families (studying in private schools) [11].

Four of the studies used randomized controlled designs and provided adequate data for inclusion in the formal meta-analysis [10,12,15,18]. Three of the studies used plaque as one of their outcomes and only one used DMFT and DMFS index for assessing the oral hygiene status after conducting dental health education. The first study describing the impact of school dental health education in India was carried out in 1992 and increase in brushing frequency was the only outcome which was assessed to measure the oral hygiene status in this study [9]. The longest follow-up of 2 years is done with the same study.

DISCUSSION

The present review shows that school dental health education programs have produced positive results which are evident from different studies. The impact varies in different studies and this may be attributed to different study populations and different methods of dental health education presentation and other environmental factors such as barriers of communication, efficiency of educators, etc. could have a modifying effect on the effectiveness of the educational intervention. The health education principles used in various interventions in all the studies varied considerably ranging from simple provision of information to use of advanced strategies like posters, audio-visual aids and other didactic materials to support the DHE activities.

A successful school oral health programme would also depend upon the response by teachers [19]. Some DHE programmes had arranged training sessions for the teachers in order to ensure reinforcement and follow up, to provide for exchange of knowledge and experience and to keep motivation high [9,10,16]. It was observed in one of the studies that there was significant reduction

in plaque scores after dental health education but there was no reduction in gingival and DMFT scores [13]. This can be due to the shorter duration of the study. An oral health programme for a longer period may show favourable results.

Awareness level of the children can be influenced by their socio-economic background. One of the studies in the literature also targeted the children coming from low socio-economic background (studying in government school) on level of awareness regarding oral hygiene [11]. Though after the intervention, awareness increased but it was significantly less as compared to the children of high socio-economic status (studying in private schools). Therefore, it is emphasized that government schools should be targeted more often for DHE as compared to private/aided schools.

Majority of the studies on impact of school dental health education programmes are conducted in southern part of India whereas very few studies are conducted in northern and western parts and no study has been conducted in north-eastern part of India. Therefore it is the responsibility of the health sector to gather data regarding the conduction of school dental education programmes in this part of the country. Moreover, parents support and involvement in child's oral health are important in influencing the oral health of the child. Majority of the surveys which are reported in the literature are targeted in school going children, due to easy accessibility, which is not possible in preschool children [20,21]. Therefore, there is a need to initiate more dental awareness programs for parents and their children at the preschool set up also to assess as well as to spread dental health awareness in the Indian society.

LIMITATION

There are few limitations of this study. It was based on a review of previous studies which were conducted in different time periods by different investigators and in different study settings. Therefore the generalizability may be inaccurate, though attempts were made to include studies having a randomized controlled design and large sample size. Furthermore, attempts were made to include all the published literature on the impact of school dental health education programmes but it is possible that some relevant data may have been left behind in terms of fugitive literature (Conference proceedings, Dissertations etc.) and important information will undoubtedly be overlooked with a search strategy as that used in present study.

RECOMMENDATIONS

Several state level or district level studies or programs can be undertaken to address the current situation in India. The program for dental health education should be structured in such a manner as to gain the student's interest and obtain a high priority of social acceptance. The object is to maintain this level of acceptance throughout the student's lifetime. The program should, therefore, be interesting, dynamic, and closely matched to the learning ability demonstrated by the child at each particular educational level. Community collaboration can also strengthen interventions to promote better oral health. Successful partnership builds on trust, respect, effective communication, shared mission and resource coordination. The school and community partners can benefit from each other. There may be a wide range of organizations and local businesses with which collaboration can be fostered. For example, food traders, manufacturers and businesses, water companies, commercial organizations and toothpaste manufacturers etc.

Evaluation is a powerful tool that can be used to inform and strengthen school health programmes. The primary aims of evaluations are to determine the extent to which the programme is being implemented as planned, to assess the outcomes, impact and effectiveness of the programme and, if any aspects have not worked well, to identify the key lessons learned. This can be done by researchers with the help of the government sector. The authors hope that this study will lead to a ripple effect (in that, oral health knowledge imparted to

the students/subjects will be passed onto their peers and family members) and impress on the planners-

- The futility of once yearly DHE program presently conducted in Indian schools, and
- The necessity of (a) providing basic oral hygiene aids like toothbrush, tooth paste etc free of cost or at concessional rates to the underprivileged and neglected sections of the society; (b) including dental health education into the existing school curriculum; and (c) co-ordinating efforts between school personnel, dental health professionals, and parents to ensure long-term benefits.

REFERENCES

- [1] Petersen PE. The World Oral Health Report 2003. Continuous improvement of oral health in the 21st century- the approach of the WHO Global Oral Health Programme [monograph on the internet]. Geneva, Switzerland: WHO; 2003 [cited 2013 Feb 15]. Available from- www.who.int/oral_health/media/en/orh_report03_en.pdf.
- [2] Retna KN. Assessment of dental treatment required and analysis of cost in the management of dental caries among semiurban primary school children of Kerala. *J Indian Soc Pedod Prev Dent*. 2000;18(1):29-37.
- [3] Kwan SYL, Petersen PE, Pine CM, Borutta A. Health-promoting schools: an opportunity for oral health promotion. *Bulletin of the World Health Organization*. 2005;83(9):677-85.
- [4] Joshi N, Rajesh R, Sunitha M. Prevalence of dental caries among school children in Kulasekharam village: a correlated prevalence survey. *J Indian Soc Pedod Prev Dent*. 2005;23(3):138-40.
- [5] Damle SG, Patel AR. Caries prevalence and treatment needs amongst children at Dharavi, Mumbai. *Comm Dent Oral Epidemiol*. 1994;22:62-63.
- [6] Dash JK, Sahoo PK, Bhuyan SK, Sahoo SK. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). *J Indian Soc Pedod Prev Dent*. 2002;20:139-43.
- [7] Thomas S, Tandon S, Nair S. Effect of dental health education on the oral health status of a rural child population by involving target groups. *J Indian Soc Pedod Prev Dent*. 2000;18(3):115-25.
- [8] WHO Information Series on School Health. Oral Health Promotion: An Essential Element of a Health-Promoting School [monograph on the internet]. Geneva, Switzerland: WHO; 2003 [cited 2013 Feb 17]. Available from- WHO/ NMH/NPH/ ORH/School/03.3.
- [9] Tewari A, Gauba K, Goyal A. Evaluation of KAP of oral hygiene measures following oral health education through existing health and educational infrastructure. *J Indian Soc Pedod Prev Dent*. 1992;10(1):7-17.
- [10] Kapadia H, Stallard, Volpe, Rustogi, Butler M. Evaluation of a curriculum for dental health in 3rd grade school children in Mumbai, India. *J Indian Soc Pedod Prev Dent*. 1999;17(2):65-8.
- [11] Goel P, Sehgal M, Mittal R. Evaluating the effectiveness of school-based dental health education program among children of different socioeconomic groups. *J Indian Soc Pedod Prev Dent*. 2005;23:131-33.
- [12] Shenoy RP, Sequeira PS. Effectiveness of a school dental education program in improving oral health knowledge and oral hygiene practices and status of 12- to 13- year old school children. *Indian J Dent Res*. 2010;21:253-9.
- [13] Ajithkrishnan CG, Thanveer K, Sudheer H, Abhishek S. Impact of oral health education on oral health of 12 and 15 year old schoolchildren of Vadodra city, Gujarat state. *J Int Oral Health*. 2010;2:15-20.
- [14] Hebbal M, Ankola AV, Vadavi D, Patel K. Evaluation of knowledge and plaque scores in school children before and after health education. *Dent Res J*. 2011;8:189-96.
- [15] Chachra S, Dhawan P, Kaur T, Sharma AK. The most effective and essential way of improving the oral health status education. *J Indian Soc Pedod Prev Dent*. 2011;29:216-21.
- [16] Chandrashekar BR, Suma S, Kiran K, Manjunath BC. The use of school teachers to promote oral hygiene in some secondary school students at Hyderabad, Andhrapradesh, India: A short term prospective pilot study. *J Fam Community Med*. 2012;19:184-9.
- [17] Bhat PK, Kumar A, Badiyani BK, Aruna CN, Sangeeta T, Bhaskar NN. Effect of oral health education on the knowledge, attitude and behavior regarding oral health among school children in Bengaluru, India. *Int Journal of Contemporary Dentistry*. 2012;3:83-88.
- [18] D'Cruz A, Aradhya S. Impact of oral health education on oral hygiene knowledge, practices, plaque control and gingival health of 13- to 15-year-old school children in Bangalore city. *Int J Dent Hyg*. 2012 Jun 30. doi: 10.1111/j.1601-5037.2012.00563.
- [19] Petersen PE, Peng B, Tai B, Bian Z, Fan M. Effect of a school-based oral health education programme in Wuhan City, Peoples Republic of China. *Int Dent J*. 2004;54:33-41.
- [20] Kaur B. Evaluation of oral health awareness in parents of preschool children. *Indian J Dent Res*. 2004;14:336-46.
- [21] Mahejabeen R. Sudha P, Kulkarni SS, Anegundi R. Dental caries prevalence among preschool children of Hubli: Dharwad city. *J Indian Soc Pedod Prev Dent*. 2006;24:19-22.

PARTICULARS OF CONTRIBUTORS:

1. Senior Lecturer, Department of Public Health Dentistry, Gian Sagar Dental College and Hospital, Rajpura, Punjab, India.
2. Senior Lecturer, Department of Public Health Dentistry, Gian Sagar Dental College and Hospital, Rajpura, Punjab, India.
3. Senior Lecturer, Department of Periodontics, PGIMER, Rohtak, Haryana, India.
4. Intern, Private Practitioner, Chandigarh, India.
5. Intern, Gian Sagar Dental College and Hospital, Rajpura, Punjab, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Ramandeep Singh Gambhir,
Senior Lecturer, Gian Sagar Dental College, Rajpura, Punjab, India. PIN- 140601.
Phone: +91-99156-46007, Fax: +91-1762 520011, E-mail: raman1g@yahoo.co.in

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Apr 09, 2013**
Date of Peer Review: **Jul 22, 2013**
Date of Acceptance: **Aug 13, 2013**
Date of Publishing: **Dec 15, 2013**