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Review Article

Success of School Dental Health Programs - A Review

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ABSTRACT

It is crucial to have good oral health for all children for their optimum success in school and in life. Schools are ideal settings for providing students with oral health knowledge and skills, along with other health practices. This review provides information about the effectiveness of interventions that promote oral health through schools. From the collected information, it was found that majority of the studies supported the implementation of school dental health programs and proved their effectiveness. It highlights the importance of the continuous implementation of school-based programs to promote the oral health and the need of intensifying the preparation of school teachers in oral health topics, as well the instructions to the mothers for their oral health care.

Key Words: Success, School, Dental, Health, Programs

INTRODUCTION

The burden of oral disease is considerable as well as its consequences and the cost. According to WHO oral health report, [1-3] 60-90% of school children have dental caries worldwide. Many oral health problems are preventable. However, there is inadequate knowledge and lack of awareness of the causes and prevention of oral disease among the children, their parents and teachers. [3] School children are considered to be an important target group for inculcating healthy habits to last for a lifetime. Healthy behaviours and lifestyles like oral hygiene practices, good dietary patterns and early dental visiting experience developed at a young age are more sustainable.

The school provides an effective platform for providing oral health services and promotion of oral health. Oral health can be included in various grade levels throughout the school curriculum, with community projects and home-based activities that involve other members of the family. Investments in schools are expected to yield gains to communities, nations and individuals in the form of improved social and economic development, increased productivity and enhanced quality of life.

This review provides information about the effectiveness of interventions that promote oral health through schools.

LITERATURE REVIEW:

There is a considerable evidence to support the effectiveness of well-conducted

school-based oral health promotion interventions worldwide. The evaluation of the major school dental programs like Tattle tooth Program, North Carolina State-wide Public Health Program, "Learning About Your Oral Health" – A Prevention Oriented School Program, Askov Dental Demonstration, School Oral Health Program Kuwait-Forsyth had shown significant increased dental health knowledge at all grade levels, found that the program favourably influenced the oral health behaviour and effected favourable changes in children's attitudes towards oral health practices. [4]

In accordance with the research conducted the main outcome measure of teaching programmes in the schools was improved knowledge of school children towards dental health. [5] Participating school students developed better understanding of correct dietary and oral hygiene advice and showed greater changes of attitude towards community dental health education. [6] Majority of the respondents and school teachers had a positive opinion concerning the existence of the programme and believed that the programme changed student's knowledge about dental hygiene. School teachers strongly believed that Dental Hygiene Education is crucial for students' well-being. [7]

Furthermore, various authors like Tai B-J .,et al (2009), [8] Jundi SH Al ., et al (2006) [9] and Horowitz A M ., et al (2006) [10] suggested that the school-based oral health promotion was an effective way to reduce new caries incidence, improve oral hygiene and establish positive oral health behavioural practices in the targeted school children. In the majority of the studies it was found that Dental health education and preventive dentistry programme resulted in mean DMFT & DMFS reductions and more of test children were caries-free compared with that of controls. [11] The reductions of DF counts were highest in free smooth surfaces of molars and in anterior teeth. Pit and fissure carious lesions were reduced nearly half. Proximal caries also diminished substantially and the number of sound primary teeth increased markedly. [12] The percentage of children without new caries lesions increased significantly. [13] Intervention in schools also showed significant reductions in plaque and gingival scores as compared to controls. [14-17] The plaque levels and the gingivitis were significantly reduced on the effect of a preventive program based on bimonthly professional tooth cleaning and hygiene instruction. [13]

In the contrary, few studies conducted by Van Palenstein Helderman WH., et al (1997), [18] Vanobbergen J., et al (2004), [19] Arrow Peter (2007) [20] and Howat A. P., et al (2006) [6] showed that the implemented school-based Oral Health Education programme did not result in significant reductions of the clinical parameters measured. They believed that one-time training of teachers in aspects of oral health was ineffective in lowering plaque levels and the effect of the oral health programme on caries levels in the study group was inconclusive. [21] Few authors believed that short-term preventive program without professional instrumentation induces only a transient improvement of gingival health of schoolchildren and that too only during the instructional period. [18,21,19,6,20] The maintenance of improved gingival health over longer time periods requires prolonged, repeated instruction by professionals. These measures may be difficult to institute and are of questionable cost-effectiveness. [22]

Effectiveness of interventions that promote oral health through schools:

There are number of approaches which can be implemented along with health education in the schools for improving the oral health of children like Tooth brushing programs, Classroom based fluoride mouth

rinse programs or Fluoride tablet / supplement program, School water fluoridation programs, Sealants placement programs. In addition, periodic dental inspection, referrals for dental care, keeping records and reports, follow up programs, emergency care and dental prophylaxis etc.

School dental screening referral was an effective way of promoting dental attendance among children with a treatment need. [23] A programme that has proved to be effective in many schools is blanket referral of children to their family dentists. Dental screening in school serves to motivate the child to better health attitudes and habits. It helps to determine the content of health instruction and serve as a medium of evaluation in health teaching. Moreover, school dental screening may be useful to decrease dental health inequalities among different socio economic groups.

Tooth brushing in schools is a valuable tool for reinforcing good oral hygiene. A classroom brushing program is an excellent way to help students learn and practice proper brushing techniques. The most important aspect of tooth brushing from an early age is to develop a regular tooth brushing habit and to provide topical application of fluoride via toothpaste to the teeth to reduce the chance of tooth decay in children. School children who participated in a school tooth brushing programme believed effective tooth brushing were able to improve their oral hygiene. [24] A longitudinal study aimed at testing the efficacy of a school-based caries preventive program proved that supervised daily tooth brushing using fluoridated toothpaste was successful in controlling dental caries in children. [9] Horowitz et al (2006) [10] demonstrated a significant reduction in plaque, DMFS and gingivitis scores from a school based tooth brushing program. With concerns about the increase in dental disease among young children, the Massachusetts Department of Early Education and Care recently adopted a new regulation for child care settings by implementing a mandatory tooth brushing in schools to promote oral health and prevent tooth decay.

Fluoride is the foundation for preventing tooth decay. There are number of fluoridation measures which can be implemented in schools. *School water fluoridation* has reduced dental caries among school children by about 40%. [25] The goal of water fluoridation is to prevent a chronic disease whose burdens particularly fall on children and on the poor in communities with no central water supply or fluoride deficient water supply. School water fluoridation is not a satisfactory equivalent alternative to community water fluoridation. Major disadvantages are - Children do not receive benefits until they begin school; It can be used only when school has independent water supply; Installation cost of equipment is high; Workers must be trained to operate, monitor and maintain the fluoridation unit.

The *School-based Fluoride Mouthrinse Program* is an important tool in our efforts to help reduce tooth decay among school aged children. Fluoride mouthrinse programs are one of the most widely used caries-preventive public health methods. The Fluoride Mouthrinse Program is targeted primarily to schools without enough fluoride in the water as well as to those in very low income areas. Fluoride Mouthrinse prevents tooth decay by 20-40% when used consistently in a school-based program. [26] The most convenient schedule for school-based public programs is weekly administration to an entire class of children after obtaining parental consent. Caries reductions from daily rinsing are only slightly greater than those from weekly rinsing. [27,28] The slight differences do not compensate for the greater practicality and lower cost of weekly rinsing in a school-based program. [29] Fluoride mouthrinse

programs are not recommended for children less than 6 years of age. [30]

Another method for administrating systemic fluoride in school settings is the daily use of dietary fluoride supplements in the form of tablets. *Dietary fluoride supplements* are intended for use among high-risk children between the ages of 6 months and 16 years who are living in non-fluoridated areas (0.6 ppm fluoride or less). [31] In a school-based fluoride supplement program, a child receives a tablet and chews it under supervision each school day. The procedure can be carried out for a classroom of children having parental consent. Supervision is needed to ensure that the children let the tablet dissolve slowly and provide appropriate topical fluoride exposure time.

Efficacy, efficiency and practical considerations of use of fluorides in school-based caries preventive programs favour requiring minimal effort for compliance by the beneficiary and have low-personnel requirements. Weekly fluoride mouth rinsing and daily ingestion of a fluoride tablet were feasible school-based procedures for the prevention of dental caries. Combined with the use of a fluoride dentifrice at home, these procedures have a pronounced cariostatic effect. Moreover, parents were supportive of the fluoride mouth rinse program as a means of preventing dental problems and improving children's oral health and they perceived that the program did not interfere with the education of the students and they willingly participated in the program. [32] Ripa L W et al., (2006) [33,34] also presented the benefits to the primary teeth from a school-based fluoride mouth rinsing program.

However, Raymer R E. et al., (2007) [35] reiterate the safety of school-based fluoride mouthrinse, fluoride tablet, or combined regimens in communities with fluoride-deficient water supplies. Research is needed to determine the possible long-term effect of, and the preventive regimen necessary to maintain, the benefits of such programs after their discontinuation. [36]

Dental sealants application has also been tested as an effective feasible measure in schools. The Surgeon General's report on oral health indicates that sealants can reduce decay in school children by more than 70 percent. [37] The cost of preventing tooth decay by placing dental sealants in children is much less than the cost of treating tooth decay, and the savings realized over a lifetime can be substantial. To be most effective, sealants should be placed on teeth soon after they erupt. Sealants are helpful for persons at increased risk for tooth decay such as those with medical conditions associated with higher caries rates, children who have experienced extensive caries in their primary teeth, and children who already have incipient caries in a permanent molar tooth. School-based sealant programs are especially important for reaching children from low-income families who are less likely to receive private dental care. In a long-term evaluation of school health program found reduced DMFS which indicated that dental sealants when used in combination with fluoride mouthrinse were particularly effective in lowering the prevalence of dental caries. [38]

Another helpful approach which is appropriate for use in school oral health programmes as mentioned in a study by Frencken JE et al., (2007) [39] is *Atraumatic Restorative Treatment (ART)* approach. There is abundance of evidence present in the literature for its effectiveness and advantages among school children. Using ART, a comprehensive package of education / promotion, prevention, curative treatment, and pain relief can be established and delivered to school children through a low cost, outreach oral health program.

Strategies indicated for the success of a school dental health program:

Bagramian R A et al., (2006) [40] demonstrated that a *combination of preventive regimens* could significantly reduce dental disease in a school population. Procedures included oral hygiene education program, dental examinations, prophylaxis, ingestion of fluoridated water, acidulated phosphate fluoride gel (1.23%) applied in trays, pit and fissure sealants (bis-GMA) on occlusal surfaces of all eligible posterior teeth and provision of all restorative care. Similarly, Marie KL et al., (2006) [41] conducted a programme in which a combination of preventive methods have been used to reduce dental caries and showed a significant plaque and caries reduction in the test group. "Brighter Smiles" a school program based on combined measures had also shown an improvement in the knowledge and behaviour of school-aged children. [42]

For the success of a dental education program *continuous implementation* is essential to promote the oral health. Studies also indicated that prevention programs must be comprehensive and continuous for maximum benefit to occur.

It may be useful to *stratify programme according to patients' needs* rather than a uniform dental examination. [43] Stratifying the school dental screening and education programme according to school type can enable oral health care personnel to administer a focused, school-based dental screening and education programme.

Involving members with an interest and decision-making role in children's health may be an effective method of influencing adoption of school-based self-applied fluoride programs and ultimately promoting children's oral health. [44] Involving parents in the school programs has proved significantly greater improvement in both the dental behaviour and dental health of the children whose parents attended the sessions. [45] Parents can provide reinforcement of oral health practices at home. Moreover, children were able to transmit knowledge acquired at school to their parents that included change in oral health routine of their family members. Almost all the parents reported that they have learned something about oral health from their children and majority of participants revealed the change in oral health habits of their family members. [46]

A successful school program would also depend upon responses by teachers. Teachers traditionally have educated children about oral health and often participate in school-based prevention programs. There is a need for greater public health *efforts directed towards elementary school teachers* in improving their oral health knowledge and opinions of about effective school-based preventive oral health programs. [47] In a study it was found that teachers were ill informed and held inconsistent opinions about basic concepts and information related to oral health and oral health promotion. Dental public health practitioners can play a critical role in assuring that elementary school teachers have current, scientifically accurate oral health information upon which to base decisions on behalf of the children they teach. Teachers should award prizes weekly, monthly and annually for participation and the school should maintain a wall of photographs of children who are caries-free as a measure of their success.

CONCLUSION

In view of these facts, it is suggested that in consultation with school principal, teachers, and the entire community, an intervention should be developed that should consist of daily brushings, fluoride application, educational presentations and a recognition/incentive scheme utilizing the existing health and educational infrastructure. There is need of intensifying the preparation of school teachers in oral

health topics, as well the instructions to the mothers for their oral health care.

REFERENCES

1. Global Oral Health Data Bank. Geneva: World Health Organization; 2004
2. The World Oral Health Report 2003. Continuous improvement of oral health in the 21st century — the approach of the WHO Global Oral Health Programme. Geneva: World Health Organization; 2003.
3. Oral Health Promotion: an essential element of a health-promoting school. Geneva: World Health Organization; 2003. WHO Information Series on School Health. Document 11.
4. Soben peter. Essentials of preventive and community dentistry. 4th edition. Arya (Medi) Publishing house, New Delhi 110002, India. p. 221-235.
5. Chapman, S. J. Copestake & K. Duncan. An oral health education programme based on the National Curriculum. Int J Paediat Dent 2006; 16: 40–44
6. Alison P. Howat, W. P. Rock, T. D. Foster. Effects of a school visit dental health programme upon the attitudes of undergraduate dental students in England. Community Dent Oral Epidemiol 2006; 10 (2): 100-110.
7. Assunc¸a˜o VA, Luis HS, Bernardo MF, Martin MD, Leroux B, DeRouen TA, Leita˜o JM. Evaluation of a 7-year school-based community dental hygiene programme in Portugal by high school teachers. Int J Dent Hygiene 2008; 6: 37–42
8. Tai B-J, Jiang H, Du M-Q, Peng B. Assessing the effectiveness of a school-based oral health promotion programme in Yichang City, China. Community Dent Oral Epidemiol 2009; 37: 391–398.
9. SH Al-Jundi, M Hammad and H Alwaeli. The efficacy of a school-based caries preventive program: a 4-year study. Int J Dent Hygiene 2006; 4 (1): 30 – 34.
10. Alice M. Horowitz, John D. Suomi, John K. Peterson, Barbara L. Mathews, Ronald H. Voglesong, Beverly A. Lyman. Effects of supervised daily dental plaque removal by children after 3 years. Community Dent Oral Epidemiol 2006; 8 (4): 171-176
11. Alexander M. Bennie, J. Ivor Tullis, Kenneth W. Stephen, Eithne E. MacFadyen. Five years of community preventive dentistry and health education in the County of Sutherland, Scotland. Community Dent Oral Epidemiol 2006; 6 (1): 1–5
12. Thomas M. Marthaler. Interim report on DMF-reduction 16 years after the introduction of a preventive program. Community Dent Oral Epidemiol 2006; 9 (5): 210-214.
13. Vibeke Kjaerheim, Frithjof R. Von Der Fehr, Sven Poulsen. Two-year study on the effect of professional toothcleaning on schoolchildren in Oppegård, Norway. Community Dent Oral Epidemiol 2006; 8 (8): 401-406.
14. Emler BF, Windchy AM, Zaino SW, Feldman SM, Scheetz JP. The value of repetition and reinforcement in improving oral hygiene performance. J Periodontol 1980; 51: 228-34.
15. Worthington HV, Hill KB, Mooney J, Hamilton FA, Blinkhorn AS. A cluster randomized controlled trial of a dental health education program for ten-year-old children. J Public Health Dent 2001;61:22-7
16. Redmond CA, Blinkhorn FA, Kay EJ, Davies RM, Worthington HV, Blinkhorn AS. A cluster randomized controlled trial testing the effectiveness of a school-based dental health education program for adolescents. J Public Health Dent 1999; 59:12-7
17. Schou L. Active-involvement principle in dental health education. Community Dent Oral Epidemiol 1985; 13: 128-32.
18. Van Palenstein Helderman WH, Munck L, Mushendwa S, van't Hof MA, Mrema FG. Effect evaluation of an oral health education programme in primary schools in Tanzania. Community Dent Oral Epidemiol 1997; 25; 296-300.

19. Vanobbergen J, Declerck D, Mwalili S, Martens L. The effectiveness of a 6-year oral health education programme for primary schoolchildren. Community Dent Oral Epidemiol 2004; 32: 173–82.
20. Peter Arrow. Oral hygiene in the control of occlusal caries. Community Dent Oral Epidemiol 2007; 26 (5): 324-330
21. Frencken JE, Borsum-Andersson K, Makoni F, Moyana F, Mwashaenyi S,Mulder J. Effectiveness of an oral health education programme in primary schools in Zimbabwe after 3.5 years. Community Dent Oral Epidemiol 2001; 29: 253–9.
22. M. Ivanovic, P. Lekic. Transient effect of a short-term educational programme without prophylaxis on control of plaque and gingival inflammation in school children. J Clin Periodontol 2005; 23 (8): 750-757.
23. Donaldson M, Kinirons M. The effectiveness of the school dental screening programme in stimulating dental attendance for children in need of treatment in Northern Ireland. Community Dent Oral Epidemiol 2001; 29: 143–9.
24. W. H. van Palenstein Helderman, L. Munck, S. Mushendwa, M. A. Van't Hof, F. G. Mrema. Cleaning effectiveness of chewing sticks among Tanzanian school children. J Clin Periodontol 2008; 19 (7): 460-463.
25. Horowitz, H.S. Effects of school water fluoridation on the prevalence of dental caries, final results in Elk Lake. J Am Dent Assoc 1972; 84: 832.
26. Oral Health in Massachusetts: A Fact Sheet http://www.mass.gov/Eeohhs2/docs/dph/com_health/oral_fluoride_community_water_factsheet.pdf. (Accessed on 18-08-10)
27. Driscoll WS, Swango PA, Horowitz AM, Kingman A. Caries-preventive effects of daily and weekly fluoride mouth rinsing in a fluoridated community: Final results after 30 months. J Am Dent Assoc 1982; 105:1010-3.
28. Heifetz, SB, Meyers R, Kingman A. A comparison of the anti caries effectiveness of daily and weekly rinsing with sodium fluoride solutions: Findings after two years. Pediatr Dent 1980; 3:17-20.
29. Burt BA, Eklund SA. Dentistry, Dental Practice and the Community. 5th ed. Philadelphia: W.B. Saunders; 1999. p. 354-355
30. CDC. Recommendations for using fluoride to prevent and control dental caries in the United States. MMWR2001; 50(RR14):1-42. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm (Accessed on 18-08-10)
31. Marx, E. & Wooley, S. F. (Eds.). Action Steps for Implementing a Healthy School Environment. Health Is Academic: A Guide to Coordinated School Health Programs (1999). New York: Teachers College Press. © 1998 by Education Development Centre. http://www2.edc.org/makinghealthacademic/concept/actions_environment.asp (Accessed on 16-07-10)
32. James P. Scheetz, Richard P. Suddick, W. Thomas Fields. Attitudes of school personnel and parents toward a school-based fluoride mouthrinse program. Community Dent Oral Epidemiol 2006; 12 (2): 82-88
33. Louis W. Ripa, Gary S. Leske. Two years' effect on the primary dentition of mouthrinsing with a 0.2% neutral NaF solution. Community Dent Oral Epidemiol 2006; 7 (3): 151-153.
34. Inger Wennhall, Lars Matsson, Ulla Schroder & Svante Twetman. Outcome of an oral health outreach program for preschool children in a low socioeconomic multicultural area. Int J Paediat Dent 2008;18:84-90
35. Ruth E. Nowjack-Raymer, Robert H. Selwitz, Albert Kingman. The Prevalence of Dental Fluorosis in a School-based Program of Fluoride Mouthrinsing, Fluoride Tablets, and

Both Procedures Combined. J Public Health Dent 2007; 55 (3): 165 – 170.
36. O. Haugejorden, L. A. Helöe Fluorides for everyone: a review of school-based or community programs. Community Dent Oral Epidemiol 2006; 9 (4): 159-69
37. U.S. Department of Health and Human Services. Oral health in America: a report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000. Available from: http://www.surgeongeneral.gov/library/oralhealth/
(Accessed on 18-08-10)
38. Gene R. Sterritt , Ralph A. Frew, R. Gary Rozier, Janet A. Brunelle. Evaluation of a school-based fluoride mouthrinsing and clinic-based sealant program on a non-fluoridated island. Community Dent Oral Epidemiol 2006; 18 (6): 288-93
39. Frencken JE, Van't Hof MA, Taifour D, Al-Zaher I. Effectiveness of ART and traditional amalgam approach in restoring single-surface cavities in posterior teeth of permanent dentitions in school children after 6.3 years. Community Dent Oral Epidemiol 2007; 35: 207–214.
40. Robert A. Bagramian. A 5-year school-based comprehensive preventive program in Michigan, U.S.A. Community Dent Oral Epidemiol 2006; 5: 234– 37
41. Lise-Marie Kerebel, Marie-Thérèse Le Cabellec, Guy Daculsi, Bertrand Kerebel. Report on caries reduction in French schoolchildren 3 years after the introduction of a preventive program. Community Dent Oral Epidemiol 2006; 13 (4): 201-203.
42. Andrew J. Macnab, Jacob Rozmus, David Benton,Faith A. Gagnon 3-Year Results of a Collaborative School-based Oral Health Program in a Remote First Nations Community. Article Alert from Rural and Remote Health, April 29 2008.
43. D Sagheri, P Hahn and E Hellwig. Assessing the oral health of school-age children and the current school-based dental screening programme in Freiburg (Germany). Int J Dent Hygiene 2007; 5 (4): 236 – 241
44. Mary H. Dulac, JoAnne Ivory and Alice M. Horowitz. Working with Non-Dental Groups to Influence Adoption of Self-Applied Fluoride Programs in Schools: One Approach. J School Health 2009; 53 (3): 184 – 188.
45. John Lee. Parental Attendance at a School Dental Program: It's Impact upon the Dental Behaviour of the Children. J School Health 2009; 48 (7): 423 – 427.
46. CAS Garbin, AJI Garbin, KT Dos Santos And DP Lima. Oral health education in schools: promoting health agents. Int J Dent Hygiene 2009; 7 (3): 212 – 216
47. Patricia H. Glasrud, P. Jean Frazier. Future Elementary Schoolteachers 'Knowledge and Opinions about Oral Health and Community Programs. J Public Health Dent 2007; 48 (2): 74-80.

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