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Review

Implementation and Effectiveness of School-Based Dental Screening

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Abstract

The majority of children and youth attend school, and timely detection of health and developmental difficulties through school-based dental screening offers a chance for prompt intervention, enabling kids to attain their full potential in terms of development and functional health. Delays in prompt intervention incur significant financial, social, and personal costs for the community, government, and healthcare infrastructure. School-based dental screening initiatives have the ability to get around many of the logistical challenges that vulnerable communities face when trying to get primary preventative dental care. Additionally, schools have the power to influence cultural norms surrounding healthy habits and connect families to care systems. To screen for dental illness and conditions, a visual dental examination of school-aged children is used. Parents of children who test positive are notified and urged to send their child to a primary care facility for additional testing of their child's dental health condition and any required medical care. Consequently, screening has two goals: to recognize test-positive cases, and to guarantee that these are followed up on for the proper management. School-based dental screening is typically a component of school health services, and its model, procedure, and goals differ based on the national policies of each country's healthcare delivery system. Effectiveness research has shown that school dental screening has not been highly successful in the study groups at reducing untreated dental caries in either the primary or permanent dentition of young children. Additionally, population-level dental attendance has not been found to increase by screening. Limited number of positively-screening children have been observed to visit a dentist post screening. Among the small percentage of the positively-screening students who visit a dentist, only a fraction has been noted to go on to receive the necessary care in follow-ups.

Keywords: school-based dental screening, preventive dentistry, school dentistry, child, adolescent

Introduction

General health, well-being, and life quality all depend on oral health. It is "a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, other illnesses and conditions that limit an individual's capacity for biting, chewing, smiling, speaking, and psychosocial well-being," according to the World Health Organization (WHO) (1). It has been observed that the presence of services does not guarantee their utilization. For instance, according to the Centers for Disease Control and Prevention (2), only 14.2% of children in the United States who were 21 years old or younger and had dental treatment in 2009 really used preventative dental services. The majority of children and youth attend school, and timely detection of health and developmental difficulties through school-based dental screening offers a chance for prompt intervention, enabling kids to attain their full potential in terms of development and functional health (3).

Untreated illness and delayed care exacerbate oral and dental issues, causing pain, suffering, and perhaps irreparable harm. Children's nutritional intake, and as a result their overall health, growth, and development, are greatly impacted by poor dental health. Poor dental health can have significant psychological effects, including disruptions to daily routines, sleep patterns, quality of life, and parenting challenges (4). It could obstruct study, activity, and peer connections at school (1). These issues are exacerbated in pediatric populations from underprivileged groups (5). Dental caries is still a prevalent chronic illness in the pediatric population. As indicated by Public Health England by the National Dental Epidemiology Program survey from 2016 to 2017, the prevalence of dental caries in five-year-old children was 23.3%, with an average of 3.4 decaying, missing, or filled teeth) (6). Tooth decay affects more than 50% of five- to nine-year-old children in the United States, and it affects more than 90% of children in several low- and middle-income nations, indicating that dental caries is a current public health concern (7). In the three- to five-year-old age group, 14.2% of children who underwent screening in 2016 in Montana had untreated deterioration (8). Children and teenagers are also susceptible to a number of gingival diseases, though at varied rates and intensities. Iran's schoolchildren between the ages of six and eleven an estimated 73% frequency of gingivitis (9). Similar to this, a sample of Greek youth showed a 72.8% prevalence of gingivitis (10). Dental health and appearance are significantly impacted by developmental enamel abnormalities (DDE) in both the primary and permanent dentition. The majority of epidemiological studies demonstrate that congenital abnormalities are becoming more prevalent in all populations worldwide (11). When dentine or pulp involvement occurs as a result of substantial enamel loss or high susceptibility to caries, it has important clinical implications (12). Children might suffer from dental and facial problems of varied severity. According to one study, the prevalence of dental trauma in children and adolescents (under the age of 18) is 17.5%, with regional variations (13). Future difficulties in children with oral trauma may be reduced with prompt treatment. In children with primary dentition, there is a high prevalence of malocclusion (66.3%) (14). Moreover, complex and expensive treatments may be avoided by identifying modifiable factors that can be addressed with preventive and interceptive orthodontics (15). Delays in prompt intervention incur significant financial, social, and personal costs for the community, government, and healthcare infrastructure. The annual global economic impact of dental illnesses was USD 442 billion, which included direct treatment expenses as well as indirect expenditures related to lost productivity from absenteeism at work and school (16). Advanced disease states may call for more elaborate, expensive procedures including root canal therapy, extractions, or general anesthesia (17). In order to address the significant burden oral illnesses place on people and communities, including the pain and suffering, function impairment, and decreased quality of life, FDI 2015 urges for global concerted effort. School-based dental screening initiatives have the ability to get around many of the logistical challenges that vulnerable communities face when trying to get primary preventative dental care (18, 19). Additionally, schools have the power to influence cultural norms surrounding healthy habits and connect families to care systems (20).

Methodology

This study is based on a comprehensive literature search conducted on September 26, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about the implementation and effectiveness of school-based dental screening programs.

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There were no restrictions on date, language, participant age, or type of publication

Discussion

Dental caries is one example of an oral disease that progresses and builds over time. Because dental caries affects people of all ages, prevention is crucial all throughout one's life. Between and within nations, there are differences in the incidence and severity of dental caries (21). According to data from the WHO dental data bank, the mean Decayed, Missing, Filled Teeth Index (DMFT) for 12-year-old children was 4.1 for developing countries and 3.3 for industrialized countries, indicating an increase in dental caries in developing nations. Twenty years ago, according to WHO data, the DMFT for the majority of developing nations was under one (22). This necessitates taking swift action to create appropriate preventive measures to address the issue. School dental screening is a statutory duty of government agencies in nations like the United Kingdom, the United States, and Canada, where it has long been a component of pediatric dental care. In a recent statement, the WHO supported dental screening of students in educational settings, noting that it "enables early identification, and prompt treatments towards oral illnesses and disorders, resulting to substantial cost savings. It is crucial in the organization and delivery of both medical and oral health services in schools (1)." To screen for dental illness and conditions, a visual dental examination of school-aged children is used. Parents of children who test positive are notified and urged to send their child to a primary care facility for additional testing of their child's dental health condition and any required medical care. There are two types of follow-up techniques, conventional methods, such as sending a referral card, information letter, or consent form; and additional techniques (23, 24). For instance, Reiss *et al.* offered phone call reminders and incentive schemes (25), while Zarod *et al*. offered intensive follow-up using personalized letters (26). A school dental screening program aims to not only identify children who have oral health issues but also to serve as a means of connecting these kids with oral health treatments (27). In order to assess the efficacy of screening in terms of increased consumption of services, such as registration with a dentist and dental attendance, it is crucial to monitor screened children (26). Consequently, screening has two goals: to recognize test-positive cases, and to guarantee that these are followed up on for the proper management. School-based dental screening is typically a component of school health services, and its model, procedure, and goals differ based on the national policies of each country's healthcare delivery system (4, 5, 23, 27). The following factors can be used to classify programs in general: those who were involved, i.e., dentists (23) and medical personnel with dental training, such as dental hygienists (28), dental nurses (29); and medical practitioners with training outside of dentistry (30), such as doctors. On the basis of techniques, it is classified into visual inspection, involving a visual examination using the tongue blade; or using a probe and mouth mirror (31). Next, it is classified into criteria-based screening or traditional screening. Criteria-based screening, as opposed to traditional screening, relies on the screening dentist's judgment, and refers students based on a predetermined checklist of criteria (32). Further, the screening intervention is classified into targeted screening (against identified/high risk populations) versus universal screening (applicable to all children of a group or subpopulation) (23, 28). Also, screenings can be classified into optional screening versus mandatory screening at school admission (4). Adequate follow-up care is necessary for school dental screening to be effective. Screening and treatment services may be offered inside of a school setting (operating as a single, linked entity). Alternatively, they may be facilitated outside of a school setting (screening and treatment services operating as separate organizations (23). According to research, being a member of a lower-income group and not having dental insurance decreases a child's chances of seeing the dentist (33). As a result, the results of school dental screening may also depend on whether parents are charged for the treatment, it is subsidized, or it is provided for free (23).

For the purpose of preserving, enhancing, and promoting children's oral health, routine oral health evaluation is essential. The prevention of short-term consequences and long-term impacts of advanced disease requires early detection of oral problems. By making children and parents aware of the condition and its potential implications, school dental screening aims to detect and intercept disease at a stage earlier than that at which the child would typically present for treatment. Australia's school dental checkup program showed screening to be a less expensive and more effective intervention than the norm (34). It confirmed that morbidity reductions attained through screening point to possible financial advantages, including lower treatment costs and fewer lost working hours (16). Targeting people who are more at risk may boost cost effectiveness (35). School settings are optimal for children's dental health screenings. Early diagnosis and treatment provide advantages that can be

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realized for long-term dental health throughout these years and into adulthood. School dental screenings were recognized by WHO in 2003 as a cost-effective method of reaching more than one billion children worldwide, and through them, their families, and communities.

The effectiveness of school-based dental screening programs has been investigated in a number of randomized controlled trials (8). A comprehensive evaluation based on these studies revealed very low-certainty evidence that was insufficient to draw conclusions regarding whether standard school dental screening can increase dental attendance. When compared to no screening, criteria-based screening has poor certainty evidence that it may increase dental attendance. However, there was no evidence of a difference in dental attendance as compared to standard screening (very low-certainty evidence). These studies showed that school dental screening was not highly successful in the study groups at reducing untreated dental caries in either the primary or permanent dentition of young children (8). Additionally, population-level dental attendance was not increased by screening (35). It could be asserted that the brief time spans between baseline and outcome exams were inadequate for dental treatment to have been finished; however, waiting periods for dental care in the communities from plenty of studies, including that from the United Kingdom, were brief (23), and there were no financial barriers to those accessing care because, in many cases, dental services are provided at no cost for pediatric populations. As they were unavailable for a baseline test or an outcome examination, a number of kids were reportedly left out of the trials under study. The influence of the program on a population will be diminished by non-attenders because no screening program can actually screen all of its target population. Nonattenders were not included in the clinical outcome analyses, hence the trials evaluated the effects of dental screening on a population in which everyone got the intervention (8). As a result, it would be reasonable to assume that the screening impact reported in the study would be greater than what could be accomplished in a program that was operational. Some kids had the intervention, but they weren't able to undergo the outcome evaluation since they weren't present at school**.** Review of the data in these studies has indicated only a weak influence of school-based screening programs on encouraging increased attendance during follow-up, and the fact that limited number of positively-screening children visit the dentist was a major factor in why screening was ineffective in reducing untreated disease (8, 23). It was shown, however, that with close monitoring, a higher percentage of children who test positive for cavities visit a dentist (26); nevertheless, further examination of these findings revealed that only a small percentage of the positively-screening students who visit a dentist go on to receive the necessary care.

Conclusion

Oral health screening needs to reach a large number of positively-screening students and ensure that they receive the necessary care if it is to minimize unresolved illness in the community. However, the added expense of more intense follow-up would need to be weighed against any gain. A trial may be able to show that the application of more aggressive follow-up techniques is successful in lowering unresolved disease. At the scale of population health, current research has not demonstrated that interventions utilized in a school dental screening program significantly lower levels of active dental caries or raise dental attendance rates. The method of dental screening used in schools today is no longer valid. Alternative strategies must be investigated to guarantee that underprivileged kids receive quality dental care.

Disclosure

Conflict of interest

There is no conflict of interest

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Ethical consideration

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Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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