Oral Health Education: Community and Individual Levels of Intervention

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Abstract

Introduction: Oral health education is an important issue that should be discussed with children and adolescents, promoting the acquisition of correct oral health behaviors. The objective of this study was to characterize the oral health behaviors among a sample of Portuguese adolescents and introduce different strategies that enable the accomplishment of collective programs appropriate for the promotion of oral health at individual and community levels.

Materials and Methods: A cross-sectional study was designed with a sample of 447 adolescents aged 12 to 19 years old, attending a public school in Sátão, Portugal. An interview was made questioning about socio-demographic factors and oral health behaviors to each adolescent. Considering the obtained results, a revision of the literature was made in order to define oral health promotion strategies to be applied among children and adolescents to improve oral health behaviors in a specific Portuguese community.

Results: The prevalence of toothbrushing (twice-a-day or more) was 90.6%. Five point eight percent of adolescents reported daily flossing. Sixty-seven percent had at least one dental appointment in the previous twelve months. Considering the results obtained, various oral health promotion strategies should be developed based on the following topics: oral health education for children and adolescents in schools and public institutions; oral health promotion for teachers and parents; technology application in oral health education; education and motivation for oral health behaviors given by health professionals.

Conclusions: Community programs should be considered and developed in order to improve knowledge and behaviors related to adolescents' oral health, giving special attention to the intervention of various health professionals, teachers and parents in the oral health education that should be transmitted to children and adolescents.

Key Words: Oral health education, Oral health promotion, Community, Oral hygiene

Introduction

The World Health Organization (WHO) defines health promotion as being a "*process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behavior towards a wide range of social and environmental interventions*"[1].

The promotion of oral health should include the creation of healthy public policies and supportive environments, development of personal skills and reorientation of the oral health services. This last definition is different from oral health education that is mostly aimed at improving oral health through the acquisition of knowledge, eventually leading to motivation and finally, to behavioral changes according to the health belief model [2,3].

The remarkable improvements in oral health in the last years reflect the strong scientific basis for prevention of oral diseases that has been developed and applied in the community, in clinical practice, and at home [4,5]. However, and despite this approach, the majority of these programs fail to achieve their aims due to the lack of attention mostly resulting from the inadequate and insufficient relationship patient-health professional in its educational aspect [6].

Various studies demonstrate that socio-economic and cultural aspects may influence the oral hygiene habits. The lack of information and knowledge about oral health behaviors and limited access to dental healthcare may explain the association between the higher risk of oral diseases and lower socio-economic status [7-12].

The degree of association between a number of social, economical and behavioral risk factors and the prevalence data for oral cancer, dental caries and destructive periodontitis have been determined in various studies. These associations should be interpreted with caution, but are suggestive of the need to take them into consideration when developing health promoting oral health policies [13-16].

Studies confirm that low social class increases the risk of developing high levels of dental caries [17]. Parents´ low educational level and professional situation (employed/ unemployed) also play an important role in the child/ adolescent oral health status [18,19]. When analyzing the acquisition of health behaviors, we must also consider the importance of values and behaviors of peers, parents and other family members who continue to be influential [19,20].

In the previous years, WHO has dedicated special attention to health-promoting programs applied in schools. Oral health education is an important issue that should be developed among the population with a view to decreasing the prevalence of oral illnesses [21].

The objectives of this study are:

- To characterize oral health behaviors among a sample of Portuguese adolescents and verify their association with socio-demographic variables.
- To introduce different strategies that allow the accomplishment of collective programs appropriate for the promotion of oral health at individual and community levels.

Materials and Methods

The first step for success in a program is the identification of each individual´s educational needs, for it is only through

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knowledge of the individual characteristics of human behavior that it will be possible to outline an action plan for the benefit of the community [6].

A non-probabilistic convenience sample of 447 adolescents aged between 12 and 19 years old, attending a public school in Sátão, Portugal, was enrolled in this epidemiological observational cross-sectional study that was carried out from September to December of 2012. An interview to each adolescent in the classroom was held inquiring about socio-demographic variables, social and daily habits and oral health behaviors. The studied sample represents the entire school group of the area, and 88.6% of its pupils were enrolled in the study.

Socio-demographic variables such as gender, age, school grade at the moment of the survey, residence area (urban/ rural), parents´ educational level (indicating the higher educational level of parents) and father´s professional situation (employed/unemployed) were taken into account. Oral health behaviors were assessed by questioning adolescents about various issues, such as: the daily frequency of toothbrushing; daily use of dental floss; number of dental appointments in the last 12 months and the reason for the last dental appointment; experience of at least one episode of dental pain during his/her lives; fear of the dentist; and comsumption of sugary beverages or soft drinks. Data analysis was carried out using the *Statistical Package for Social Sciences* (SPSS 18.0 version). Prevalence was expressed in proportions and compared by the Chi-square test and continuous variables by the Kruskal-Wallis and Mann-Whitney tests. The significance level established the inferential statistics was 5% ($p<0.05$).

This research involving human data has been performed in accordance with the Declaration of Helsinki and was submitted and approved by the Ethics Committee of the Health School and Research Centre for Education, Technology and Health Studies of the Polytechnic Institute of Viseu, Portugal (CI&DETS).

The information collected by questionnaires was provided voluntarily and confidentially. Anonymity of collected information was guaranteed since adolescents were told not to sign their names or write down any other form of identification in any part of the questionnaire. Data collection was made only for adolescents whose parents signed an informed consent that explained the objectives of the study.

Considering the obtained results, a revision of the literature was made in order to define different strategies that enable the accomplishment of collective programs appropriate for the promotion of oral health at individual and community levels.

Results

The final sample was composed of 447 adolescents, 38.3% males and 61.7% females, all between the ages of 12 and 19 years old, from a public school of Sátão, Portugal. When analyzing the parents' educational level, we verified that 4.3% had parents that only attended school until no later the 4th grade, 53.5% stayed in school from the 5th to the 12th grade and 15.0% proceeded to a higher degree after finishing the 12th grade. The analysis of the distribution of the sample by residence area showed that the majority of individuals lived in rural areas (rural=65.3% vs urban=34.7%).

In the sample under analysis, we verified that 13.3% of the adolescents considered having a very good oral health, 65.7% good oral health and 21.0% moderate/poor oral health. When assessing daily toothbrushing, 9.4% brushed their teeth only once a day, 67.3% twice a day and 23.3% 3 or more times a day.

When adolescents were asked if they also brushed their tongue during oral hygiene, 83.2% referred to brushing their teeth, not forgetting to brush the tongue, thus corresponding to a complete process of brushing. Adolescents were also questioned about their oral hygiene learning process, and in this situation we verified that 41.7% referred that their dentist never taught them how to toothbrush, while 58.3% said that their dentist had, at least once, talked about basic measures of daily oral hygiene.

When assessing the use of dental floss, our study showed that only 5.8% used dental floss daily, while 33.9% referred using dental floss sometimes and 60.2% said that never used dental floss during their oral hygiene.

The number of dental appointments was another important analysed variable and our results demonstrated that 67.0% had a dental appointment in the last twelve months which demonstrates that a high prevalence of adolescents do not have a dental appointment at least twice a year. When assessing the main reason for the last dental appointment, 85% referred having regular dental appointments, 35.8% visited a dentist due to dental pain and had a dental appointment in an emergency situation and 58.2% for dental caries treatment.

The prevalence of dental fear among adolescents was of 15.3%, a fact that can compromise regular dental appointments these adolescents should schedule at least twice a year. Finally, and after analyzing of the variable referring to the consumption of sweet beverages and soft drinks, the prevalence among adolescents was of 92.5%.

By analyzing the association between socio-demographic variables and dental appointments in the last twelve months, we verified significant statistical differences among dental appointments in the aforementioned period and father´s unemployment (unemployed=41.5% vs employed=68.1%, $p<0.001$) and crowding index ($\leq$1=67.4% vs >1=55.0%, $p=0.04$) *(Table 1)*.

When associating the consumption of soft drinks and socio-demographic variables we observed that the prevalence of sweet beverages consumption was higher among younger adolescents ($\leq$15 years=97.8% vs >15 years=86.7%, $p<0.001$) and those living in rural areas (rural=93.8% vs urban=88.2%, $p=0.04$).

Taking into account these results, various oral health promotion strategies should be developed and should be structured based on the following main points:

- Oral health education for children and adolescents in schools and public institutions;
- Oral health promotion for teachers and parents;
- Technology application in oral health education;

- Education and motivation for oral health behaviors given by health professionals.

Table 1. Prevalence of dental appointments (last twelve months) and the association with socio-demographic variables.

Dental appointment (last twelve months)	No		Yes		
	N	%	N	%	p
Parents´ educational level					
≥4 grade	5	26.3	14	73.7	0.16
5-12 grade	83	35.0	154	65.0	
>12 grade	15	23.1	50	76.9	
Father´s professional situation					
Employed	100	31.9	213	68.1	<0.001
Unemployed	24	58.5	17	41.5	
Gender					
Male	62	36.9	106	63.1	0.1
Female	84	30.5	194	69.5	
Age					
≤15 years	75	33.7	150	66.7	0.5
>15 years	65	34.0	126	66.0	
Residence area					
Rural	78	34.2	150	65.8	0.4
Urban	48	35.6	87	64.4	
Crowding index					
≤1	114	32.6	236	67.4	0.04
>1	9	45.0	11	55.0	

Oral Health Education for Children and Adolescents in Schools and Public Institutions

Countries have been developing comprehensive programs involving health and educational sectors [3]. Oral health education is a major public health issue that must be taught to children and adolescents within the family and school environment. Oral health promotion is very important in order to insure the application of primary prevention methods such as daily tooth brushing at least twice a day, daily use of dental floss and regular visits to dentists to prevent and detect oral diseases at an early stage. Oral health education is the first step in the prevention of oral diseases in order to decrease socio-demographic differences and to give equal opportunities of oral health, thus promoting measures necessary for the improvement of the population's quality of life [22-24].

Oral health education should also cover food hygiene comprising the control of the consumption of cariogenic foods with a high content of carbohydrates, which is fundamental to avoid dental caries development [16,25,26].

We can still verify the existence of numerous schools with vending machines selling foods and beverages with a high sugar intake. It is strictly necessary to promote the decrease of sweet foods and beverages in schools and around school buildings. Therefore, school policies should have into account the necessary change with a view to preventing the consumption of sweets and to motivating the consumption of healthy foods and drinks [27,28].

Another important issue that should be acknowledged in oral health education is the unnecessary fear of dental appointments. Studies demonstrate that this is one of the main reasons for avoiding a visit to the dentist, especially among children and adolescents [29,30].

The best way to teach the main aspects of oral health to children and adolescents is going to their school environment to explain the importance of:

- Ensuring proper oral hygiene habits;
- Fluoride application at home and during dental appointments;
- Fissure sealant application and regular reassessment;
- Regular check-up dental appointments at least twice a year;
- Decreasing sugar intake and maintaining a well-balanced nutritional intake to prevent dental caries;
- Consuming fruit and vegetables that can protect against oral cancer;
- Stopping tobacco use and decreasing alcohol consumption to reduce the risk of oral cancers, periodontal disease and tooth loss;
- Using protective sports and motor vehicle equipment to reduce the risk of facial injuries [31,32].

These important aspects can be explained during simple oral health education sessions using audiovisual equipment, showing the best toothbrushing techniques with the use of mouth and teeth macromodels. The demonstration of simple and comprehensive movies, interactive plays that can be used in mobile phones, theatrical plays, puppet plays and fairy tales help understand the importance of oral hygiene. The advertisement in *facebook* and other digital platforms and the distribution of pamphlets with a summary of the oral health education session implemented by dental and health professionals can also become also be an efficient method for teaching and motivating children and families to develop better oral health behaviors.

Oral Health Promotion for Teachers and Parents

Training of trainers programmes for school teachers should also be developed in Portugal aiming at increasing national capacities in relation to the integration of oral health promotion in schools. It is important that oral health education does not become limited to children and adolescents. It should also reach teachers and parents. The suggestion of developing oral health education meetings is essential to explain the importance of adequate oral health behaviors for their children and students, and even for themselves, since parents may not have a wide knowledge about oral health, thus being unable to transmit it to their children [19,33].

Children tend to copy the habits and attitudes of their own parents and teachers. The same can be verified when

analyzing oral health behaviors. If adequate oral hygiene habits are practiced at home by other family members, when children become adolescents, brushing has been converted into an integral part of their hygiene and self-care practices [6,34].

The Application of Technology in Oral Health Education

Developments in science and technology are providing patients with better quality and more convenient oral health care, namely in the field of oral health education. Knowledge of technologies and associated skills enable the development of new pathways to teach oral health. Bearing in mind the importance of technology nowadays, the implementation of oral health education and its association with new technologies are essential to draw the community's attention and to reach the public, namely children and adolescents [35].

One of the objectives still to be accomplished is the design of a web-based program specifically for oral health education that would be comprehensive in scope and relevant to the target audience. This web-based program should address the following aspects:

- Promote oral hygiene practices that should be developed at home and integrated in school health programmes, such as regular daily toothbrushing, daily use of dental floss and the application of fluoride;
- Encourage healthy dietary habits;
- Demonstrate the necessity of regular check-up dental appointments and preventive measures applied in a dental office, such as fissure sealant application.

Development and implementation of specific videogames and programs involving oral health aspects can also become an interesting measure to be implemented and the to teach oral health in schools and even at home for children and adolescents in the presence of their family and teachers.

Health Professionals: Education and Motivation for Oral Health Behaviors

The role of health professionals is crucial to the struggle against the development of oral diseases. Health promotion and oral health education programs should be continuously repeated with a view to achieving long-term favorable results and acceptable levels of motivation for change in oral health behaviors [6,36].

Health professionals have an important role in the development of global policies in oral health promotion and oral disease prevention as far as the following aspects are concerned:

- Building oral health policies towards effective control of risks to oral health;
- Stimulating development and implementation of community-based projects for oral health promotion and prevention of oral diseases, with a focus on disadvantaged and poor population groups;
- Encouraging national health authorities to implement effective fluoride programmes for the prevention of dental caries;
- Advocating for a common risk factor approach to simultaneously prevent oral and other chronic diseases;
- Providing technical support to countries to strengthen their oral health systems and integrate oral health into public health [37-39].

It is necessary that the services and health interventions are programmed appropriately bearing in mind the economic and social status. It is worth pointing out that proposals do not inadvertently undermine communities´ health or reinforce social inequalities [40].

On a more individual and clinical level, the dental professional must assess the oral health status of his/her patient in order to understand the needs and identify the instructions that should be given. Understanding the oral health behaviors of a patient is essential to orientate the health promotion methods that can be applied [33].

The health professional and even dental students, in collaboration with universities, can also provide less expensive dental appointments and even free primary preventive appointments for those who present more socio-economical difficulties [41].

Discussion

The present study demonstrates that measures must be taken in order to improve oral health behaviors among Portuguese adolescents. The daily routine of toothbrushing has continuously been well established, but there is still a lack of comprehension of the importance of completing oral hygiene with other methods, such as the use of dental floss and regular dental appointments [42,43]. This study also reflects the relation between oral health behaviors and socio-demographic factors already referred in other studies [8,9,44,45].

Portugal was identified in the Portugal Health System Performance Assessment as one of the European countries in which there were proportionally more difficulties to improve the population's oral health. Even if there are no significant studies on the prevalence of oral health problems on the Portuguese adult population, there are some studies about the school population that identify moderate rates of dental caries [46,47]. Unfortunately, in Portugal nowadays we observe an increase of unemployment that limits the access to medical and dental healthcare due to the economic and social crisis. In Portugal, the population's unequal access to oral healthcare is evident. It is widely known how difficult it is to individuals facing socio-economic disadvantages to have access to oral healthcare. This situation results from the fact that the vast majority of oral healthcare is currently provided by the private sector, involving funds that not everyone is able to support [48].

The lack of information about the importance and the need of a dental appointment should be a part of oral health education in order to decrease the fear and anxiety of visiting a dentist [41,49]. Another major risk factor related to the development of oral diseases is the consumption of sugary foods and drinks. In this study, we verified that a high

proportion of adolescents consume sugary beverages on a regular basis. This proves the necessity of alerting the population, namely children/adolescents and their parents, for the negative effects of excessive sugar intake on oral health [26]. The enterprises that make and sell softdrinks and sweet foods should also be advised in the reduction of the percentage of sugar incorporated in their beverages and snacks that are of easy access to children and adolescents.

By considering the results obtained in the present study, it is clear that it is urgent to develop and implement oral health education in effective terms, so that oral health knowledge can improve and the oral hygiene status of children and adolescents change [16,50].

Schools are an excellent starting point for preventive action in the field of oral health. Education is the backbone of development in any country, and in order to be really fit for school, children first need to be healthy. Those who suffer poor health cannot concentrate or actively participate in school activities. Healthy children, on the other hand, attend school more regularly and can benefit fully from what the education system has to offer. School health programmes, therefore, have the potential to combine resources for education, health, nutrition and sanitation at the same venue: the school [4].

Dental and health professionals and dental medicine students in association with schoolteachers should seek to mobilize and strengthen health promotion and education activities at local, national, regional and global levels. The initiative is designed to improve the health of children, school personnel, families and other members of the community through schools. Promoting health in schools reinforces the importance of school as a healthy setting for living, learning and working [39].

Health promotion and oral health education programs should be continuously repeated in order to achieve long-term favorable results and acceptable levels of motivation for change in oral health behaviors [51].

With the improvement of knowledge of oral and physical manifestations associated with oral health behaviors and inadequate eating habits, the dental practitioner make more accurate assessment, and identify mechanisms for decreasing the potential for further damage to the teeth and the oral cavity, thereby improving their patients´ quality of life [52].

An oral health program should also constantly be monitored and evaluated. It is the only way to assess the quality and the effectiveness of an oral health program applied to a determined community. The planning, monitoring and evaluation of a proposed program must take into consideration all the steps outlined, such as identifying needs, assessing resources, determining priorities, setting new goals and remodeling strategies in order to become adequate to the community where the program is applied [32].

Conclusions

Community programs should be considered and developed in order to improve knowledge and behaviors related to adolescents' oral health, drawing special attention to the intervention of various health professionals, teachers and parents in the oral health education that should be transmitted to children and adolescents.

Therefore, oral health education activities directed towards the prevention of risk factors for developing oral diseases should involve both parents and their children, because parental behavior is a significant indicator of children's oral health.

Good health is a major resource for social, economic and personal development. Health promotion, therefore, goes beyond health care. It puts health on the agenda of policy makers in all sectors and at all levels, directing them to be aware of the health consequences of their decisions and to accept their responsibilities for health. Promoting health in the social and cultural settings where people live is the most creative and cost-effective way of improving oral health and, consequently, the quality of life in a target community.

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Competing Interests

The authors declare that they have no competing interests.

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