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EFFECT OF A HEALTH EDUCATION PROGRAM IN THE ORAL HEALTH PROFILE OF PRESCHOOL CHILDREN: AN EXPERIENCE IN THE PUBLIC NETWORK OF PORTO ALEGRE, BRAZIL

Efeito de um programa de educação em saúde no perfil de saúde bucal de pré-escolares: uma experiência na rede pública de Porto Alegre, Brasil

El efecto de un programa de educación en salud en el perfil de salud bucal de preescolares: una experiencia en la red pública de Porto Alegre, Brasil

Original Article

ABSTRACT

Objectives: To estimate the effect of health promotion activities developed in a child education school, on the children's oral health profile, relating oral manifestations to social, sanitary and feeding factors. **Methods:** Interventional, longitudinal and describing quantitative work, accomplished with 41 preschool children aged four to six years, living in the area assisted by an *Equipe de Saúde da Família - ESF* (Family Health Team) in the city of Porto Alegre-RS. Diagnosis of dental caries and gingivitis was carried out through oral clinical examination at the beginning and at the end of the study. The dietary pattern was obtained by applying a questionnaire and the social-sanitary aspects of the families, from the records of the A-Form in the *Sistema de Informação da Atenção Básica - SIAB* (Primary Health Care Information System). **Results:** Caries disease was diagnosed in 58.5% (24) of the children, whose dmft index (total sum of decayed, extracted and filled teeth) was 2.43. There was a decrease in the number of decayed teeth and an increase in extracted and filled teeth. The rates of visible plaque and gums bleeding got better. The social-sanitary aspects were standardized in the community, being not representative. The group presenting the highest dmft values followed a diet containing sugars, with viscous consistence and an intake frequency of four or more times a day. **Conclusion:** The activities of health promotion developed in the school partially changed the children's oral conditions. There was a positive correlation between consistency, composition and frequency of diet and the presence of caries disease; on the other hand, there was no significant relation between social-sanitary conditions and the presence of oral diseases.

Descriptors: Family Health Program; Health Education; Oral Health; Child, Preschool; Dental Caries; Gingivitis.

RESUMO

Objetivo: Avaliar o efeito das atividades de promoção de saúde desenvolvidas em uma escola de educação infantil, no perfil de saúde bucal das crianças, relacionando as manifestações bucais com fatores socio sanitários e alimentares. **Métodos:** Trabalho quantitativo, de intervenção, longitudinal, descritivo, realizado com 41 pré-escolares de quatro a seis anos, da área adstrita a uma Equipe de Saúde da Família (ESF) no município de Porto Alegre-RS. A aferição da cárie e gengivite se deu por exame clínico bucal no início e ao final do estudo. O padrão alimentar foi obtido pela aplicação de um questionário e os aspectos socio sanitários das famílias, a partir dos registros da ficha A do Sistema de Informação da Atenção Básica (SIAB). **Resultados:** A doença cárie foi constatada em 58,5% (24) das crianças, cujo índice ceo-d (somatório dos dentes cariados, extraídos e obturados) foi 2,43. Houve diminuição dos dentes cariados, com aumento dos extraídos e obturados. Os índices de placa visível e sangramento gengival melhoraram. Os aspectos socio sanitários foram padronizados na comunidade, não sendo representativos. O grupo com valor mais elevado de ceo-d possuía uma dieta composta por açúcares, com consistência pegajosa e frequência de quatro vezes ou mais por dia. **Conclusão:** As atividades de promoção de saúde desenvolvidas na escola modificaram parcialmente as condições de saúde bucal das crianças. Houve relação

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positiva entre a consistência, composição e frequência da dieta e a presença da doença cárie; por outro lado, não houve relação significativa entre as condições socio sanitárias e a presença de doenças bucais.

Descritores: Programa Saúde da Família; Educação em Saúde; Saúde Bucal; Pré-Escolar; Cárie Dentária; Gingivite.

RESUMEN

Objetivos: Evaluar el efecto de las actividades de promoción en salud desarrolladas en una escuela infantil, en el perfil de salud bucal de niños, relacionando las manifestaciones bucales con los factores socio sanitarios y de alimentación. **Métodos:** Trabajo cuantitativo, de intervención, longitudinal, descriptivo, realizado con 41 preescolares de cuatro a seis años, del área de un Equipo de Salud de la Familia (ESF) en el municipio de Porto Alegre-RS. La identificación de caries y gingivitis se dio por una evaluación clínica bucal en el inicio y al final del estudio. El patrón alimentario fue obtenido a través de la aplicación de un cuestionario y los aspectos socio sanitario de las familias, a partir de los registros de la ficha A del Sistema de Información de la Atención Básica (SLAB). **Resultados:** La caries fue identificada en el 58,5% (24) de niños cuyo el índice ceo-d (la suma de los dientes con caries, los extraídos y los obturados) fue de 2,43. Hubo disminución de los dientes con caries, con aumento de los extraídos y obturados. Los índices de placa visible y sangramiento de las encías mejoraron. Los aspectos socio sanitarios fueron estandarizados en la comunidad y no fueron representativos. El grupo con valor más elevado de ceo-d poseía una dieta de azúcares de consistencia pegajosa y frecuencia de cuatro veces al día o más. **Conclusión:** Las actividades de promoción de la salud desarrolladas en la escuela modificaron en parte las condiciones de salud bucal de los niños. Hubo relación positiva entre la consistencia, composición y frecuencia de la dieta y la presencia de caries; por otro lado, no hubo relación significativa entre las condiciones socio sanitarias y la presencia de enfermedades bucales.

Descritores: Programa de Salud Familiar; Educación en Salud; Salud Bucal; Preescolar; Caries Dental; Gingivitis.

INTRODUCTION

Sistema Único de Saúde - SUS (Unified Health System - UHS) is a public policy established by the Constitution of 1988, consisting of a regionalized and hierarchical network of programs and services, the primary health being the gateway to this system⁽¹⁾.

In this scenario, *Programa de Saúde da Família - PSF* (Family Health Program), implemented in Brazil in the 1990's, was presented as a proposal to reorient the current medical care model and today it stands as the strategy of the *Ministério da Saúde - MS* (Ministry of Health). The working process of the *Equipes de Saúde da Família - ESF* (Family Health Teams) is guided by the principles of territorial coverage, extended family care practice,

interdisciplinary and team work, promotion of intersectoral actions, holistic approach and encouragement to community participation. Within this strategy, the major differential is due to incorporating in the team a professional who lives in the community which he works in. The *Agente Comunitário de Saúde - ACS* (Community Health Agent) is the one responsible for the liaison and closeness between the community and the health team⁽²⁾.

In order to align the professional practice with the new guidelines of SUS, the *Ministérios da Educação e da Saúde* (Ministries of Education and Health) have established *Programas de Residência Multiprofissional* (Multiprofessional Residency Programs) to graduate professionals up to the work in teams according to the principles of SUS⁽³⁾. The *Programa de Residência Multiprofissional da Saúde da Família e Comunidade - PREMUS* (Multiprofessional Residency Program of Family and Community Health) by the *Pontifícia Universidade Católica do Rio Grande do Sul - PUCRS* (Pontifical Catholic University of Rio Grande do Sul) comprises residents of seven health districts who work in an interdisciplinary manner, respecting equity, comprehensiveness and humanization of care. The *Unidades de Saúde da Família - USF* (Family Health Units) taken as the residents' scenario of practice are located in the Eastern region of the city of Porto Alegre-RS.

The team planned the activities according to the concepts of health promotion, which is a social and political process that strengthens the skills and capabilities of individuals and fosters changes in social, environmental and economic conditions, in order to minimize their impact on individual and public health⁽⁴⁾. Popular education in health, from Paulo Freire's perspective, was taken as the fundamental axis of the actions, providing opportunities for moments of exchange, understanding and development of healthy habits aiming at autonomy⁽⁵⁾.

This experience of intersectoral work, performed by the multiprofessional team and the resident in dentistry in a school of early childhood education, pointed out the demands in preschoolers' oral health and the need to evaluate the actions of health promotion and disease prevention developed in the context of this school.

The study is justified given the importance of this phase of life, where many concepts and knowledge are experienced and absorbed, being the school an appropriate environment for understanding the health-disease process, especially in a playful way, making the children incorporate the importance of self-perception and self-care as a way to maintain health and reduce diseases⁽⁶⁾. The objective of the research is to evaluate the effect of health promotion activities on the oral health of preschoolers, relating their oral manifestations to social-sanitary, dietary and family conditions.

METHODS

This is a longitudinal, descriptive quantitative research of intervention. The population comprised 04 to 06-year-old children of a community located in the area linked to an USF in an area of vulnerability in the *Gerência Distrital Norte/Nordeste* (East/Northeast Management District) of Porto Alegre. The convenience sample consisted of 41 children from that age group, attending a school of early childhood education, who participated in the activities of health promotion at school, with parents' consent. The sample was evaluated at the very first moment, in April 2010 (initial phase), and reassessment occurred after completion of the work at school in November 2010 (final phase).

This study received approval from the *Comitê de Ética em Pesquisa da Secretaria de Saúde Municipal* (Research Ethics Committees of the Municipal Health Secretariate) of Porto Alegre (001.003298.11.6) and from PCURS (11/05350).

In the period from April to November 2010, an intervention project, of an educational approach, was developed in a school of early childhood education in the coverage area of the health unit. According to the needs presented by the school director and the availability of the residents in the fields of practice, a schedule including interdisciplinary and dentistry activities was organized weekly, every other day.

Actions in oral health were developed starting from the observation of the school routines regarding food, mealtimes and oral hygiene. From that first step, the educators were rendered capable concerning the practices of oral health, including oral hygiene, the use of toothpaste (amount and recommendations) and the criteria for replacement of toothbrushes.

The meetings about oral health happened in a playful way, with reading and interpretation of stories from the series 'Party of the little teeth'⁽⁷⁾, which addresses the importance of taking care of the teeth, through the use of toothbrush, toothpaste, dental floss, and also a healthy diet. The methods used included puppet theater with characters from the stories, demonstration of oral hygiene in a dummy and visualization of dental plaque (biofilm) through the rinse of the solution Replak (Dentsply), which marks the biofilm. In a second moment, the stories were discussed in a conversation circle, besides using drawings, music and dance, with the goal of bringing the issues closer to the daily habits. At the end of each meeting, the children brushed their teeth under supervision for improvement of the daily habit.

The researcher performed the clinical checking of the oral conditions, during home visits in the company of the ACS. The study was explained to the person responsible to

the child, by reading the Free and Informed Consent Term. After consent, the evaluation of the visible plaque index (VPI), the presence of dental calculus and gingival bleeding index (GBI) were conducted according to an adaptation of the dental exam form of the Municipality of Porto Alegre and according to what is scientifically recommended⁽⁸⁾. VPI, GBI and calculus were considered positive when this condition was present in three or more dental elements.

To assess dental caries, an index suitable for epidemiological studies was employed, the dmft index (number of decayed primary teeth, with extraction indicated and filled), hence composed by the sum of teeth affected by decay, whether they have not been treated yet (decayed) or have been treated by a conservative approach (filled) or a mutilating one (drawn/lost), being an index endorsed by the World Health Organization (WHO)⁽⁹⁾. The criteria followed the recommendations of the *Pesquisa Nacional de Saúde Bucal do Ministério da Saúde - Projeto SB 2010*⁽¹⁰⁾ (National Survey of Oral Health of the Ministry of Health – SB Project 2010). In all the examinations, the environment was provided natural light, weather conditions were stable, being the examinee and the examiner facing each other. The standards of a Biosafety Guide⁽¹¹⁾ were respected, regarding the environment and the employed materials.

The children in need of dental treatment were referred to their local health unit and oral hygiene instructions were strengthened to the children and the people responsible to them, according to the characteristics of each family.

To collect data on dietary patterns, a modified validated questionnaire⁽¹²⁾ was applied, which allows the evaluation of the influence of a high-sugar diet on the occurrence of lesions. To achieve that, foods were divided in categories when typing the data, according to their composition, consistency and frequency^(12,13).

Regarding the composition and consistency, food was classified as pasty carbohydrate (bread, potatoes, pasta, cakes and biscuits), liquid sugar (milk, coffee, tea, juice with added sugar or sweetened cocoa powder and soft drinks) and pasted sugar (candy, chips and sweets). As to the daily frequency of ingestion of these foods, the categories corresponded to none; one; two or three; and four or more times.

Characterization of the children's social-sanitary conditions was raised from family records in the A-Form of the *Sistema de Informação da Atenção Básica - SIAB* (of Primary Health Care Information System)⁽¹⁴⁾ and subjective observation was made by the researcher during home visits. The items used were literacy, occupation of the people in charge of the children, sanitation and housing situation, media and transport used.

Data was tabulated and analyzed through Epi Info 3.5.3 version, comparing the distribution of frequency of dental

caries and gingivitis between the initial and final moment and their relation with the social-sanitary conditions and diet. The Chi-square was used as a test to check the significance of social-sanitary conditions, dietary patterns and VPI, GBI, calculus indices, and paired T-Student test to analyze the mean dmft. Significance coefficient under 0.05 was considered statistically significant and less than 0.1, as indicative of significance.

RESULTS

Among the 41 preschoolers in the sample, 25 (61%) were female and 16 (39%) were male (Table I).

On the conditions of occupation of the people in charge of the children, it was observed that 34 (82.9%) of the 41 children had either both parents or main carers on steady jobs, none (0%) had one or both main carers unemployed

and seven (17.1%) of them had one or both main carers with temporary employment. Regarding education, only one of the carers was not literate (Table I).

The possession of consumer goods was considered an indirect measure of the income and socioeconomic status of the respondents. All families owned television and radio sets, and owning a car was a condition present in 16 (39%) cases (Table I). The average number of rooms per family was 4.5. There was no significant association between the conditions of income, education and occupation of parents and the occurrence of oral diseases.

Regarding the sanitation conditions, it was found that all households were provided garbage collection and public water supply, but only 25 (61%) of them had sewer lines and 37 (92.5%) families consumed water as provided, without any additional treatment by chlorination or filtration (Table I).

Table I - Social-sanitary conditions for the sample. Porto Alegre-RS, 2010.

Variables	Description	n(%)
Gender	Male	16 (39%)
	Female	25 (61%)
Main carers' occupation	In permanent employment	34 (82.9%)
	Temporary employment	7 (17.1%)
	Unemployed	0
Main carers' literacy	Literate	40 (97.6%)
	Not literate	1 (2.4%)
Means of communication	Radio and television	41 (100%)
Means of transport	Car	16 (39%)
	Public	25 (61%)
Housing and sanitation conditions	Garbage collected	41 (100%)
	Public water supply	41 (100%)
	Sewer system	25 (61%)
	Water without additional treatment	37 (92.5%)

Table II - Composition of DMFT at baseline and at the end of the study. Porto Alegre-RS, 2010.

	Initial n (%)	Final n (%)	p values
Decayed	1.99 (81.9%)	1.54 (63.7%)	0.08
Mutilated	0	0.14 (5.7%)	0.04
Filled	0.43 (18.1%)	0.74 (30.6%)	0.21

Table III - VPI, GBI and calculus indices at baseline and at the end of the study. Porto Alegre-RS, 2010.

	Initial (%)	Final (%)	p values
VPI	70.1%	63.4%	0.48
GBI	34%	29.3%	0.35
Calculus	7%	0	0.07

The results on the sanitation conditions showed similarity for the whole sample. In this region there are areas of invasion in constant growth, along with risk areas, where streams are not channeled and some unpaved roads and irregular constructions are found.

Concerning the oral conditions, 17 of 41 children (41.5%) were caries-free (dmft = 0) as the study began. The others' dmft at baseline was virtually identical to the final moment's, with an average of 2.43 teeth affected. There was a change in the composition of this index, where the prevalence at baseline was 81.9% decayed teeth, 18.1% filled teeth and no tooth to be extracted. At the end, the composition of dmft changed to 63.7%, 30.6%, 5.7% respectively. The decayed component of dmft presented a value indicative of significance ($p = 0.08$) and the component 'm' of the index was significantly different ($p = 0.04$) between the two moments (Table II).

As set forth in Table III, when the gingival condition was evaluated, prevalence of visible plaque occurred in 29 (70.1%) children, with a reduction to 26 (63.4%) at the end. The prevalence of gingival bleeding decreased from 14 (34%) to 12 (29.3%). The presence of dental calculus decreased from 3 (7.3%) to zero (0%), the difference being indicative of significance by the Chi-square test ($p = 0.07$).

Among the 41 children studied, it was found that 40 (97.5%) used to eat pasty carbohydrate. The ones presenting ingestion frequency of four or more times a day had a dmft of 2.38, which is higher than the dmft 1.5 of the children whose frequency was 2 or 3 times per day. Preschool children who drank liquid sugar 4 or more times per day also had the dmft higher than the others. And children with high pasty sugar consumption had the highest value of dmft.

DISCUSSION

According to the principles of SUS⁽¹⁵⁾, changes in the model of care and the working process based on comprehensiveness, equity and inter-sector activities to promote health, according to the needs of the community, enabled the development of this study. The insertion of the Residency in the Family Health Strategy contributed to perform this study, because it is a model that approximates the population that is assisted and it is appropriate for the reality where it is inserted in.

Data collection conducted during home visits improved the researcher's approach to the children's family and the recognition of their housing conditions. The absence of paving in some areas, not channeled streams and irregular constructions constitute a scenario of risk conditions for disease development and represent the vulnerabilities of the studied community.

Considering other social-sanitary aspects, authors⁽¹⁶⁾ have found that the educational level, employment status of those responsible to the children, family income and sanitation conditions have influence on their health and on the occurrence of oral lesions, as well. In this study, the results on parents' schooling and occupation and other social-sanitary variables did not prove to be statistically significant for the occurrence of caries and gingivitis.

One of the difficulties in categorizing social-sanitary conditions of the children in the study was due to the scarcity of information in the A-Form of *SIAB* regarding some criteria. Definition of the educational status considers the option 'literate and non-literate', instead of measuring the years of study. In the economic conditions, ownership of consumer goods and occupation of adults are listed, not mentioning the salary ranges for the tracing of the family income. The modification of this instrument has been discussed in recent years and one of the proposals⁽¹⁷⁾ suggests the incorporation of additional data, such as per capita income in minimum wages, schooling in years, number of people per room in the household, and criteria for categorization of these data to allow a situational analysis.

Another problem in this study, besides the A-Form failings, was the lack of an available system for the instrument analysis. This can occur because this form is used by health teams as a tool for collection and transference of data on health situation to the management, where the analyses are performed⁽¹⁸⁾. An additional feature that may have contributed for the values of this study being not so significant, when evaluating the association between the occurrence of caries and periodontal disease and the social-sanitary aspects, is related to the fact that the families live in similar conditions, a standard occurring in this community.

Once considered the vulnerability of the community where these children are inserted - in the area of a unit within the Family Health Strategy - and considering the sample was not representative of the population of that area, a comprehensive study about the social factors and their relationship with the occurrence and variation in the pattern of oral diseases is indicated, being important to understanding the multiple causes of diseases and planning actions in this group.

According to the preliminary results of SB 2010⁽¹⁰⁾, dental caries remain the Brazilians' main problem on oral health, with the value of 2.3 dmft for the index age of 05 years old, very close to the value found in the sample of the study, which was 2.43. This value is considered as low prevalence of caries according to the WHO⁽⁹⁾, but the percentage of caries-free children (41.5%) is far from the target set for the year 2010, equivalent to 90% of the population free of caries at 05 years old⁽¹⁹⁾. This low caries prevalence can

be explained by the access to fluoride in toothpaste, food and the public water supply, that is provided in 100% of households⁽²⁰⁾.

The maintenance of dmft values between the start and end time can be explained by the chronic characteristics of this condition and the period of interaction of the several etiologic factors for the manifestation of lesions⁽²¹⁾. The change of the components of dmft index indicates that children had access to health services, since there was a decrease in the number of decayed teeth, with simultaneous increase of filled and extracted teeth. Authors⁽²²⁾ stated in their research that the main component 'd' of the dmft index highlights the inequity of access to dental services, both preventive and restoring, for some segments of the population. They also reported that, when access is obtained, the procedures that are most commonly performed are dental extractions instead of restorative procedures. This cruel expression of dental mutilations prevailed in this study. Preventive and health education activities, developed both individually and collectively, in addition to the expansion of dental assistance and equity of access, could favor the reduction of the prevalence of oral diseases and the dmft index, with prevalence of the restored component.

The existence of a positive correlation between a diet composed of sugars and caries has been verified by researchers^(23,24). Among the sugars, sucrose is considered the most involved in caries development, because of its metabolic process performed by the bacteria in the biofilm and the capacity to make oral environment more acidic. Dietary conditions of the sample concerning the daily frequency of intake (4 times or more per day), the pasty consistence of food and sugar intake were observed in the group that had the highest dmft index. Other authors⁽²⁵⁾ also observed the conditions and said the texture of sticky foods is favorable to its retention in the oral cavity and the higher the frequency of intake, the longer the period when the oral environment remains acidic, favoring its imbalance, with a tendency to the tooth mineral loss. The *Programa Nacional de Alimentação Escolar*⁽²⁶⁾ (National School Nutrition Programme) states that a balanced diet influences the child's growth, development and learning, and the development of healthy eating habits. Considering that the preschoolers in this study remained in school fulltime, actions to orientate the school lunch ladies could contribute favorably to the establishment of a balanced diet and to the maintenance of the oral environment balance, among other benefits.

When analyzing the presence of biofilm and gingival inflammation, evidenced by VPI, GBI, and calculus, an improvement in the levels of oral health was noticed at the end point when compared with the initial one. Periodontal disease is an infectious disease caused by microorganisms in the biofilm, which must be removed and controlled as the essential method of maintaining periodontal health⁽²⁷⁾.

The disorganization of biofilm reduces the inflammation levels in a relatively short time, when a satisfactory change is made in oral hygiene habits.

The preventive weekly actions and children's supervised tooth brushing within this research may have been responsible for the improvement of the indices measured when comparing the initial and final time of the study. Public Health Dentistry employed with educative and health promoting actions, rooted in light technologies, is an effective and economical means to prevent the onset or worsening of oral lesions. Such actions, based on comprehensive health care in the health unit, as well as in the community spaces, and on the enrolled population accountability, are common assignments to all members of a healthcare team and can be developed by any professional⁽²⁸⁾.

The analysis of the results obtained in this study, especially those concerning gum matters, was important to identify a positive effect of the developed educational activities on the preschool children's health. It is believed that the playful method employed in health-promoting activities and the bond established according to the work regularity favored achieving better oral health indices⁽⁶⁾. This effect could have been stronger if some difficulties had been overcome. Among them, it is necessary to mention the incorporation of oral hygiene habits to school routines, equity of access to dental services, and the commitment of those responsible for the children, along with the activities at school. The accountability of all the actors involved in caring for these children could have encouraged changes related not only to the educational and preventive practices, but also to a healthy diet.

It is known that the family nucleus is considered a social unit, essential for health promotion and disease control, and its influences can determine effective replies, behavioral changes and changes in the conditions of general and oral health of its members⁽²⁹⁾. The family motivation and popular education with a liberating dimension refer to the exchange of knowledge and experiences that provide an understanding of the children's health status as a result of their living conditions⁽⁵⁾.

CONCLUSIONS

The observed results indicate partial effectiveness of health promotion activities developed at the school in the improvement of children's oral health conditions, since not all findings can be considered significant. There was a positive relation between the consistency, composition and frequency of diet and the presence of caries; on the other hand, there was no significant relation between social-sanitary conditions and the presence of oral diseases.

It is hoped that this research shall contribute to the implementation of preventive measures in an intersectorial and interdisciplinary way and give subsidies to action planning. Despite the accomplishment of this study in a specific population, which limits the possibilities of generalizations, it contributed to the analysis of that community's health status and pointed out the importance of preventive and curative activities in the children's lives.

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