Evaluation of the National Program of Oral Health Promotion (NPOHP) at schools in Castelo Branco, Portugal

Avaliação do Programa Nacional de Promoção em Saúde Oral (NPOHP) em escolares de Castelo Branco, Portugal

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Abstract

Aim: to evaluate the impact of the National Program of Oral Health Promotion (NPOHP) in children from Castelo Branco (Portugal) through the evaluation of DMFT/dmft indexes and the association between these indicators and different socioeconomic variables. Methodology: One hundred and thirty-five children aging 6-7 and 169 aging 11-12 years from public schools (urban and rural region) of Castelo Branco (Portugal) were randomly selected in the sample. Forty-nine percent of the children aging 6-7 and 55.0% aging 11-12 from the sample participated in the program. A semi-structured questionnaire was applied to get information about socioeconomic, behavior and knowledge factors regarding to oral health. Univariate and multivariate analyses were applied. Results: the dependent variable was "dmft+DMFT". Statistically significant differences were verified for both ages to the dmft+DMFT indexes means between the group that was assisted by the program and that one unassisted. Children assisted by NPOHP showed lower caries prevalence. Two independent variables (study group and father's occupation) were statistically associated to caries experience (children aging 6-7). For children aging 11-12, caries experience was statistically associated to the study group, dwelling and father's occupation. In the multivariate analysis, the va-riable "study group" remained in the model for both age groups. Conclusion: the children who were included in the NPOHP program showed lower dental caries pre-valence; therefore, it is crucial that children unassisted by the NPOHP program join it.

Keywords: DMF index. Oral health. Socioeconomic factors.

Introduction

The definition of prevention and promotion in oral health, as well as the service care plans, should be guided by the epidemiological studies results. These studies should be done periodically at local, regional and national level to identify, evaluate and check the distribution and trends of the severity and prevalence of disease[1].

The school is a particular environment to the development of health programs since there are children in ages that are favorable to the assimilation of preventive behavior, as oral hygiene and diet[2-4].

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It has been reported in the literature that educative and preventive programs are effective to dental plaque control. The interventions applied in these programs to achieve a better oral hygiene can induce a significant reduction of the gingival inflammation and periodontal disease[5,6].

Since 1986, in Portugal, the Health General Direction (Direção Geral de Saúde) has applied proposals to the National Program of Oral Health Promotion (NPOHP). This program has been developed by the public services in central, regional and local level. Different activities in education and promotion of oral health, including fluoride use, have been useful to the improvement of the oral health in Portuguese students[7].

The aims of the NPOHP are: improve the knowledge and behaviour regarding to oral hygiene, decrease the incidence and prevalence of dental caries, increase the percentage of caries-free children, generate a national oral health database, attend children with disabilities and people who are deprived, and go to the public schools and institutions[8].

In the present study the objectives were to evaluate the impact of the National Program of Oral Health Promotion (NPOHP) through the evaluation of dmft + DMFT indices and the association between these indicators and different socioeconomic variables.

Materials and method

This study was approved by the Research Ethics Committee of the School of Medicine and Dentistry of University of Lisbon. The schoolchildren were examined after the signature of the Informed Consent by their parents.

Sample

One hundred and thirty-five children aged 6-7 and 169 aged 11-12 years-old from public schools (urban and rural region) of Castelo Branco (Portugal) who may or may have not been assisted by the National Program of Oral Health Promotion (NPOHP) in 2006 were randomly elected in the sample for this cross-sectional study (n total = 304)[8].

Clinical exams

The clinical exams were performed at school, under artificial lighting and using probe (WHO 621) and buccal mirrors. WHO criteria for caries diagnosis were applied (1997).[9]

Questionnaire

A previous tested questionnaire was applied to the legal represent with eight closed questions adopted from Arnrup et al. (2001).[10] The following information was collected: whether the children were assisted by the program, parent's occupation and urban or rural habitation, Communitary Periodontal Index, diet, toothbrushing frequency, perception about importance of the PPSO.

Statistical analysis

A descriptive analysis of the data was done. The mean of DMFT and dmft were calculated. Thereafter T "student" and Chi-square test were applied (p = 0,05). The dependent variable dmft + DMFT (caries prevalence) was dichotomized by the median to apply the univariate analysis. The logistic regression models were adjusted by estimating the Odds Ratios (OR), their 95% confidence intervals (CI), and significance levels. Statistical analyses were performed using the SAS 9.1.3 (SAS Campus Drive, Cary, North Carolina, USA) at a 5% significance level.

Results

One hundred and eight schoolchildren aged 6-7 and 118 aged 11-12 years were from urban area (n = 226) and 27 children aged 6-7 and 51 aged 11-12 were from rural area (n = 78). Within the group of 6-7 years old, sixty five children were assisted by NPOHP and 70 were not (n = 135); while in the 11-12 years old group, 93 were assisted by the program and 76 were not (n = 169).

The percentages of the components of the DMFT and dmft indices to the children aged 6-7 are presented in Table 1.

The mean of the dmft+DMFT indices by component are presented in Table 2. The means of the components d, f, D, F, DMFT and dmft + DMFT showed statistically significant differences between the groups. The group who was assisted by NPOHP was shown to be 43.1% caries free, while the unassisted group was 32.9% caries free.

Table 3 shows the percentage of the components of the DMFT and dmft indices for children aged 11 and 12 with respect to the two groups.

Table 4 shows the DMFT and dmft means by component to both groups of children. Statistically significant differences were verified between the groups when the means of DMFT and dmft were added, respectively 1.62 for assisted children and 3.50 for unassisted children, as well differences for all DMFT components between these groups.

Three hundred and four questionnaires were sent to the legal representative of the children and 188 were given back (61.8%). Univariate and multivariate analyses regarding the association between the independent variables and the dependent variable "caries prevalence" (dmft + DMFT) are shown in Table 5. A statistically association was verified between caries experience (dependent variable) and "study group" and father's occupation. The varia-

bles with p > 0.15 in the univariate analysis were tested in the logistic regression model. Only "study group" remained statistically significant (p = 0.05). In the logistic regression analysis, unassisted children showed a 2.15 times greater chance of having dental caries than the assisted children.

Table 6 shows the result of univariate and multivariate analyses for children of age 11-12. A statistically significant difference was verified between "study group", house and father's occupation with the dependent variable "caries prevalence". In the multivariate analysis only the variable "study group" was retained in the model. The unassisted children by NPOHP showed a 6.0 times greater chance of having a dmft + DMFT > 2 in comparison to that ones assisted by the health program.

Table 1 - Frequency and percentage of the components of DMFT and dmft indexes to "assisted" and "unassisted" groups at age 6-7 in Castelo Branco, Portugal

Group	Component	Frequency	%
Assisted	d	63	68.5%
	m	0	0.0%
	f	29	31.5%
	dmf	92	100.0%
	D	13	68.4%
	M	0	0.0%
	F	6	31.6%
	DMF	19	100.0%
Unassisted	d	138	93.2%
	m	2	1.4%
	f	8	5.4%
	dmf	148	100.0%
	D	57	95.0%
	P	0	0.0%
	F	3	5.0%
	DMF	60	100.0%

Table 2 - Mean and standard deviation of the DMFT/dmft index by component to children aged 6 -7. Castelo Branco. Portugal. 2007

Group	Component	Mean	SD	Miminum	Maximum
Assisted	d*	0.97	1.65	0	8
	m	0.00	0.00	0	0
	f*	0.45	1.06	0	4
	dmf	1.42	2.22	0	11
	% dmf = 0	53.8%			
	D*	0.20	0.51	0	2
	M	0.00	0.00	0	0
	F*	0.09	0.46	0	3
	DMF*	0.29	0.72	0	4
	% DMF = 0	81.5%			
	dmf + DMF*	1.71	2.27	0	11
	% caries free (dmf + DMF = 0)	43.1%			
Unassisted	d	1.97	2.55	0	9
	m	0.03	0.24	0	2
	f	0.11	0.50	0	3
	dmf	2.11	2.78	0	11
	% dmf = 0	42.9%			
	D	0.80	1.66	0	6
	M	0.00	0.00	0	0
	F	0.05	0.26	0	2
	DMF	0.86	1.72	0	6
	% DMF = 0	74.3%			
	dmf + DMF	2.97	3.38	0	14
	% caries free (dmf + DMF = 0)	32.9%			

* Statistically significant difference between children assisted and not assisted by the program (t test).

Table 3 -   Frequency and percentage of the components of DMFT and dmft indices to "assisted" and "unassisted" groups at age 11-12. Castelo Branco, Portugal. 2007

Group	Component	Frequency	%
Assisted	d	27	71.1%
	m	5	13.1%
	f	6	15.8%
	dmf	38	100.0%
	D	55	48.7%
	M	0	0.0%
	F	58	51.3%
	DMF	113	100.0%
Unassisted	d	35	92.1%
	m	1	2.6%
	f	2	5.3%
	dmf	38	100.0%
	D	206	90.0%
	P	4	1.7%
	F	19	8.3%
	DMF	229	100.0%

Table 4 - Mean and standard deviation of the DMFT/dmft index by component to children aged 11-12. Castelo Branco. Portugal. 2007

Group	Component	Mean	SD	Minimum	Maximum
Assisted	d	0.29	0.60	0	3
	m	0.05	0.27	0	2
	f	0.06	0.38	0	3
	dmf	0.41	0.81	0	4
	% dmf = 0	74.2%			
	D*	0.59	0.97	0	4
	M*	0.00	0.00	0	0
	F*	0.62	1.12	0	5
	DMF*	1.21	1.64	0	7
	% DMF = 0	49.5%			
	dmf + DMF *	1.62	1.77	0	7
	% caries free (dmf + DMF = 0)	36.6%			
Unassisted	d	0.46	0.92	0	4
	m	0.01	0.11	0	1
	f	0.02	0.16	0	1
	dmf	0.49	0.92	0	4
	% dmf = 0	71.1%			
	D	2.71	2.58	0	13
	M	0.05	0.28	0	2
	F	0.25	0.78	0	5
	DMF	3.01	2.69	0	13
	% DMF = 0	21.1%			
	dmf + DMF	3.50	2.81	0	13
	% caries free (dmf + DMF = 0)	18.4%			

* Statistically significant difference between children assisted and not assisted by the program (t test).

Table 5 - *Univariate and Multivariate analysis of the association between caries experience and independent variables in the group of children aged 6-7*

Univariate Analysis			
Variable	Dmft + DMFT		p-value
	≤ 1	> 1	
Groups			
Assisted	41 (63.1%)	24 (36.9%)	0.0288
Unassisted	31 (44.3%)	39 (55.7%)	
Father's occupation			
Superior/medium level (Cat. 1)	18 (72.0%)	07 (32.0%)	0.0035
Sellers (Cat. 2)	19 (59.4%)	13 (40.6%)	
Farmer/Machine Operator/not qualified (Cat. 3)	5 (23.8%)	16 (76.2%)	

Multivariate Analysis			
	DMFT	Odds Ratio	Odds Ratio (Confidence interval)	p-level
Groups				
Assisted	24 (36.9%)	1.00	1.08 – 4.28	0.0298
Unassisted	39 (55.7%)	2.15		

Table 6 - *Univariate and Multivariate analysis of the association between caries experience and independent variables in the group of children aged 11-12*

Univariate Analysis			
Variable	DMFT + dmft		p-value
	≤ 2	> 2	
Dwelling			
a. Urban	76 (64.4%)	42 (35.6%)	0.0352
b. Rural	24 (47.1%)	27 (52.9%)	
Groups			
Assisted	73 (78.5%)	20 (21.5%)	< 0.0001
Unassisted	27 (35.5%)	49 (64.5%)	
Father's occupation:			
Superior/medium level (Cat. 1)	31 (72.1%)	11 (27.9%)	
Sellers (Cat. 2)	18 (48.7%)	19 (51.3%)	0.0403
Farmer/ Machine Operator/ not qualified (Cat. 3)	16 (47.1%)	18 (52.9%)	
Toothbrush frequency:			
a - Three times a day	55 (54.5%)	46 (45.5%)	
b - Twice a day	14 (73.7%)	5 (26.3%)	0.1370
c - Once a Day	0 (0.0%)	0 (0.0%)	

Multivariate Analysis

Variable	DMFT	Odds Ratio	Odds Ratio (Confidence interval)	p-level
Groups				
Assisted	20 (21.5%)			
Unassisted	49 (64.5%)	6.00	2.56 – 14.00	< 0.0001
Father's occupation:				
Superior/medium level (Cat. 1)	11 (27.9%)	1.00		
Sellers (Cat. 2)	19 (51.3%)	2.36	0.85 – 6.49	0.5617
Farmer/Machine Operator/not qualified (Cat. 3)	18 (52.9%)	3.31	1.16 – 9.43	0.0983

Discussion

In the present study, children assisted by the program showed lower percentage of dental decay and more filled teeth (Table 2 ad 3) in comparison to children who were not assisted. This confirms the importance and value of educative and preventive oral health programs. In the group of assisted children lower means of dental caries experience was verified, with respect to the components of the dmft + DMFT index.

In 1999, Almeida et al.[11] (2003) verified in a sample of 1599 schoolchildren in Portugal that 53.1% of the children aged 6 were caries-free and showed a dmft index of 2.1, value that is similar to the children not assisted by the program in the present study. Regarding to children aged 12, 47.1% were caries-free and the DMFT index was 1.5 with a mean value similar to that one for children who were assisted by NPOHP.

A national study, called "National study in the dental caries prevalence in schoolchildren"[12] verified higher values of the dmft (3.56) and DMFT (2.95) indices, respectively for 6 and 12 year olds. In other national study[13] conducted between 2005 and 2006, it is possible verify a decrease in dental caries experience since the mean dmft index was 2.10 for children aged 6 and the mean DMFT index was 1.48 for children aged 12. In this last study, a dmft of 1.90 and a DMFT of 1.48, for children aged 6 and 12, respectively, was verified in the central region of Portugal, where the city of Castelo Branco is located.

The percentage of caries-free children were 33.0% and 27.0%, respectively for children aged 6 and 12 in 2000 in Portugal[12]. In the last national study, these values were, 51.0% and 44.0%, respectively[13]. Costa et al.[14], 2008, verified in Leiria, Portugal, that 52% of children aged 6 and 67% aged 12 were caries-free. In Castelo Branco, forty-three percent of children aged 6-7 who were assisted by the program were caries free, whereas 32.9% of unassisted children presented no tooth decay. Of the assisted and unassisted children aged 12, 36.6% and 18.4% were caries free, respectively,

In the present study that was carried out between 2006 and 2007, it is shown in tables 2 and 4 that children who were assisted by the program showed caries experience similar to that demonstrated for Portugal[13]. However, children who were not taking part of the program showed values similar to that ones demonstrated in the study of DGS in 2000[12].

The European strategy and the defined goals for oral health established by World Health Organization (WHO) point out that in 2020 at least 80.0% of children aged 6 will be caries free and for children aged 12, the DMFT index should not be higher than 1.5[15]. Although Portugal has achieved this value of DMFT, a good recommendation would be to imple-

ment the NPOHP in Castelo Branco for those unassisted children.

The socio-economical level has been pointed out as a relevant determinant of dental caries. Different studies have approached the correlation between the social level and dental caries and periodontal disease[16-21].

Nowadays it is clear the polarization group that retained the higher level of dental caries prevalence in a population. The socio familiar determinants settle the individual behaviors, for example to oral hygiene practices, food intake habits and preventive care[22,23].

According to the questionnaire about socioeconomic factors applied during the National study, the parents of schoolchildren aged 12 had the most basic education and worked in occupation of intermediate level. In the present study, for children aged 6-7 a statistically significant association was observed between the "father's occupation" and "caries experience". In this group, 72% of the children with dmft/DMFT $\leq$ 2 had father that worked in a professional category of medium to high level. This suggests a clear relation between the socioeconomic level and disease prevalence. This association was also verified for age 11-12.

The significant association observed between the profession of the parents and the caries experience has been verified in various studies[18,23,24]. The mother's profession can be more relevant regarding the behavior aspects than to socioeconomic level, since if they do not have sufficient understanding on oral health they are not able to inform their children about oral health prevention[25].

In the present study, for children aged 11-12, a statistically significant association was verified between the variable "dwelling" and "caries experience". Sixty four percent of children from urban areas showed dmft/DMFT $\leq$ 2, whereas 52.9% of the children from rural area showed dmft/DMFT > 2. Almeida et al. (2003)[11] verified that children aged 6 that lived in periurban and rural areas presented higher caries experience in comparison to children living in urban areas.

According to the recommendations of NPOHP, the National Study carried out in 2005/2006[13], health determinants, including the behaviors regarding oral health and food intake by children and young should be evaluated. The percentage of children aged 6 who brushed their teeth more than once per day was 74% and for children aged 12, the value was 89%. In the present study, regarding this topic, 82.5% of the parents of the children aged 6-7 asserted that the teeth were brushed three times a day. Twice a day was the frequency that prevailed in the parents of children aged 11-12.

In the present study, the NPOHP was considered very important to parents of the children that composed the sample and they asserted they took their kids to take part of the program. This fact is

relevant since the familiar environment is fundamental to the development of a health care consciousness.

Conclusions

It was verified that there is a positive impact on the preventive oral health care service and preventive program in Castelo Branco, due to the significant improvement of oral health in children 6-7 and 11-12 years old who were assisted by this program Therefore, it is crucial that children who are not assisted by the NPOHP join the program.

Acknowledgment

Resumo

Objetivo: avaliar o impacto do Programa Nacional de Promoção da Saúde Oral (NPOHP) em escolares de Castelo Branco (Portugal) por meio do uso do índice CPOD/ceod e associações entre esses indicadores em diferentes classes socioeconômicas. Metodologia: foram selecionadas de modo aleatório para constituir a amostra 135 crianças com idades entre 6 e 7 anos e 167 crianças entre 11 e 12 anos de escolas públicas (zona urbana e rural) de Castelo Branco (Portugal). Crianças de 6-7 anos (49%) e com idade de 11-12 anos (55%) participaram da amostra. Foi elaborado um questionário semiestruturado para a coleta de informações sobre a situação socioeconômica, comportamento e condições de saúde oral. Foram utilizadas análises e multivariadas no estudo. Resultados: a variável "ceod + CPOD" foi a variável de resposta. Foram encontradas diferenças estatisticamente significantes em ambas as idades para o índice CPOD/ceod entre os grupos acompanhados pelo programa e o grupo de controle. Crianças acompanhadas pelo NPOHP apresentaram índice de cárie menor. Duas variáveis independentes (grupo de estudo e a ocupação do pai) foram estatisticamente associadas à experiência de cárie (crianças de 6-7 anos). Em crianças de 11-12 anos, a experiência de cárie foi associada ao grupo de estudo, habitação e ocupação do pai. Na análise multivariada, a variável grupo de estudo permaneceu no modelo para ambos os grupos etários. Conclusão: as crianças inseridas no NPOHP apresentaram menor prevalência de cárie dental. Dessa forma, é importante que as crianças não assistidas pelo NPOHP sejam incluídas no programa.

Palavras-chave: Fatores socioeconômicos. Índice CPO. Saúde bucal.

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