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ARTICLE

Accuracy of partial protocol to assess prevalence and factors associated with dental caries in schoolchildren between 8-12 years of age

Acurácia de um protocolo parcial para avaliar a prevalência da cárie dentária e fatores associados em escolares entre 8 e 12 anos de idade

Precisión del protocolo parcial para evaluar la prevalencia y factores asociados a la caries dental en escolares entre 8 y 12 años de edad

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Abstract

The aim of this study was to test accuracy and reliability of a partial protocol (PP) of oral examination involving the permanent first molars. This cross-sectional study was carried out in two stages. First, a cross-sectional study was performed in a representative sample of 1,211 children using DMFT-index in a full-mouth protocol (FM). A PP was simulated from FM data using only data from the permanent first molars. A second part was performed with 202 children examined by a gold standard examiner (FM) and three dentists using the PP to assess its reliability. Accuracy of PP was assessed by sensitivity/specificity/predictive positive and negative values. Inter-examiner reliability in comparison with gold standard examiner was assessed using weighted kappa. The prevalence of dental caries observed using DMFT index was 32.4% and was 30.2% for PP. The PP presented high sensitivity (93.1%; 95%CI: 91.5-94.5), showing similar magnitude of association's measures for all associated factors investigated. When compared with the gold standard FM examination, all examiners obtained high parameters of sensitivity and specificity (around 90%). Predictive negative values were higher than predictive positive values for the examiners. This study showed that this partial protocol involving the permanent first molars is accurate and reliable as a screening tool to assess dental caries prevalence and associated factors in schoolchildren.

Dental Caries; Oral Diagnosis; Data Accuracy; Child

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Introduction

Despite the reduction in both prevalence and severity levels observed in the last decades, dental caries are still a major oral health problem around the world [1,2], with high relevance in terms of public health [3]. According to Sheiham & Sabbah [4], dental caries in permanent teeth follow universal patterns of progression and occlusal surfaces are the zones with greater vulnerability to caries development. Caries commonly start in the first molars, mainly because the eruptive stage provides favorable conditions for carie development until occlusion is reached [5,6,7]. The disease's severity determines which teeth and sites are affected [6]. Cumulative effect in caries' experience during the life-course is constant. Thus, the risk does not vary with age, since environmental and behavioral factors that are constantly present have the most influence in their development [8].

In view of the slow and gradual progression of dental caries, oral screening in children is an important factor to track individuals who already have lesions in permanent dentition and so to stop the disease from progressing further [4]. Hence, risk groups can be defined and development of strategies for treatment and prevention for these individuals can be designed [9,10]. Therefore, when thinking in terms of public health, this screening must be carried out quickly and efficiently with the maximum sensitivity and specificity possible. Additionally, it should be easy and quick to execute in large groups [10].

Traditional methods employed in investigations of dental caries prevalence are very detailed and costly as they require engagement of a big team of professionals over a long period of time. These factors highlight the importance of developing rapid screening methods to determine the burden of dental caries in populations [10], especially when the aim is planning oral health services. Considering that the distribution of dental caries follows a pattern in patients with disease activity [4,6,8,9], it would be possible to screen dental caries using a partial protocol (PP) in a short period of time. However, few studies [10,11,12] have assessed the accuracy of the PP examination in comparison with a full-mouth examination (FM), as recommended by the World Health Organization (WHO) through DMFT index [13]. Our hypothesis is that the tested PP will be able to estimate dental caries prevalence and its relationship with associated factors in Brazilian schoolchildren aged from 8-12 years.

Thus, this study's aim was to test the accuracy and reliability of a PP of oral examination for screening dental caries, assessing the first permanent molars in comparison with a FM examination.

Methods

This study was carried out in two stages. Firstly, a cross-sectional study was conducted to test the accuracy of the PP of oral examination to assess dental caries prevalence and its relationship with associated factors. The second part assessed the reliability of the PP applied by different examiners.

Part 1: testing the accuracy of the partial protocol

A school-based cross-sectional study was performed with children aged from 8-12 years, living in the urban area of Pelotas, Rio Grande do Sul State, Brazil, and enrolled in public and private schools in 2010. A multistage random sample was used for subject recruitment. The first-stage unit comprised 15 private and five public schools in Pelotas to ensure selection of a representative sample of both public and private schools in the city. Schools were randomly selected depending on the number of children enrolled in each school. The second-stage unit comprised five randomly selected classes in each school. This study investigated several outcomes of oral and general health.

Sample size calculation considered a prevalence of 10% of dental trauma, standard error of 3%, a confidence level of 95%, a design effect of 2.0, and an increase of 20% in the sample size to account for non-response. Final sample required was 922 children. Sample calculation for dental caries was smaller than the calculation presented. Considering a prevalence of dental caries of 30% on unexposed and exposed/unexposed ratio of 1.0, the sample of this study has 80% chance to detect prevalence ratios ≥ 1.3. In each one of the selected classes, all children 8-12 years of age and with mixed or permanent dentition were invited to participate. The study excluded children with physical and/or mental disabilities. More details about methodology can be found elsewhere [14].

Data was collected by through questionnaires for the parents and interviews and clinicals examination of the children. The questionnaire was sent to parents via their children and comprised of socioeconomic and demographic data. Family income was obtained in continuous form (Brazilian Reals) and categorized into quartiles. Maternal schooling was collected in completed years of formal education and categorized into four groups: 12 or more; 9 to 11; 5 to 6; and 4 or less. In addition to the questionnaire, an informed consent form requesting their participation and explaining the purpose of the study was also sent.

After the questionnaires were returned, previously trained dental students interviewed the children at school. Demographic characteristics, including gender and age, and self-perception of oral health were collected. The type of school was categorized as public or private. Children's oral health self-perception was obtained by the question "How do you feel about your teeth and your mouth?" and dichotomized into "good/very good" and "fair/bad" [15]. Noteworthy, schools were visited as many times as necessary to ensure an absence rate maximum of 10%. Finally, after the children were interviewed, six dentists with experience in epidemiological studies performed oral clinical examinations in school chairs using individual artificial light, a buccal mirror and a CPI probe. Children did not brush their teeth before dental examination. Plaque index was assessed using the Simplified Oral Hygiene Index (OHI-S) and categorized into tertiles. Dental caries was assessed by DMFT index [13], using a FM examination of children. Prevalence of dental caries was assessed considering the presence of the disease when DMFT ≥ 1. Examiner reliability was assessed on a tooth-basis by means of weighted kappa. The lowest kappa value was 0.62 and the mean inter-examiner kappa was 0.74.

This study was approved by the Ethics Research Committee of the Dentistry School at the Pelotas Federal University (protocol n. 160/2010). All parents received an informed consent form explaining the aim, features, importance of the study and requesting their participation. All children were invited to participate and signed a consent form.

- **Statistical analysis**

A database was created and statistical analysis was performed using Stata 12.0 software (StataCorp LP, College Station, United States). From FM data, a PP of clinical examination was simulated using only data from the first permanent molars. This option was chosen because ethical concerns precluded two different examinations in the same children (FM and PP). The PP consisted of examining all the first permanent molars.

Descriptive analysis was performed to estimate the prevalence of overall caries and the distribution of lesions per tooth. To test the association between independent variables and the prevalence (DMFT of FM or PP ≥ 1) of dental caries, bivariate Poisson regression models with robust variance were used. The level of significance for all analysis was set at 5%. The comparison between PP and FM protocol was performed according to the following parameters: (a) sensitivity (prevalence in the tested protocol / prevalence in the gold standard protocol FM X 100); (b) absolute bias (absolute difference between prevalence in the tested protocol and prevalence in the gold standard protocol FM); (c) relative bias (percentage of true prevalence underestimation = absolute difference in the prevalence / prevalence in the gold standard FM X 100); and (d) inflation factor (prevalence in the gold standard protocol FM / prevalence in the tested protocol).

Part 2: reliability of the partial protocol

The second part of this study was carried out in three philanthropic schools located in Pelotas. All students enrolled from 2nd to 7th grade were invited to participate.

Clinical examinations were performed for screening dental caries using the PP to assess its reliability. Three previously trained dentists from public oral health services were invited to participate as examiners. A gold standard examiner, with experience in epidemiological studies, performed the examination of participants using a FM protocol. The criteria from DMFT index were adopted [13]. Clinical examination was performed using personal protective equipment, a wooden spatula and a headlamp.

Before starting, a three-hour theoretical and practical training was performed by a researcher with previous experience in epidemiological studies of dental caries. The training process consisted of two hours of theoretical explanation about DMFT index, using images of different aspects and stages of carious lesions. After this, one hour of practical training was held, to practice and discuss the adopted criteria and examination protocols. Each dentist had the opportunity to examine three individuals.

The study was approved by the Ethics Research Committee of the Pelotas Federal University (protocol n. 101/2009). Prior to participation in the study, all parents received an informed consent form requesting the participation of their children. All children were invited to participate and signed consent forms.

- **Statistical analysis**

Prevalence of dental caries (DMFT ≥ 1) was obtained from both FM and PP from all dentists. The accuracy of the partial protocol compared to FM examination, sensitivity, specificity, positive predictive value and negative predictive value were calculated. Inter-examiner reproducibility of professionals in comparison to gold standard examiner was also assessed by kappa statistics. Weighted kappa was used to evaluate the reliability of categorical DMFT index (decayed, missing and filled), and simple kappa to evaluate DMFT in dichotomous category (presence or absence of lesion). For analysis of categorical DMF, by weighted kappa, the categories were ranked according to their severity (0 = healthy; 1 = restored without caries; 2 = restored with caries; 3 = decayed; 4 = lost due to caries).

Results

Part 1

A total of 1,744 children were eligible in the first part of this study. Of these, 419 (24%) children did not have the informed consent form signed by their parents, and 114 (6.7%) children were not present during data collection. Thus, 1,211 children were included in the final sample, representing a response rate of 69.3%. Sample description is presented in Table 1. According to Figure 1, carious lesions in molars represented 84.3% (95%CI: 82.0-86.2) of total lesions in the upper and lower arches. Prevalence of dental caries using DMFT index was 32.4% (95%CI: 29.7-35.0). Considering only first molars, the prevalence was 30.2% (95%CI: 27.7-32.9).

Clinical evaluation considering the PP presented high sensitivity (93.1%; 95%CI: 91.5-94.5), an absolute bias of -2.2%, 6.8% of relative bias and 1.07 of inflation factor. Table 1 shows the association of dental caries prevalence, obtained from different protocols, with independent variables. Regarding associated factors, similar results were found for tested protocols. Older age, lower level of maternal education and family income, higher visible plaque index, enrolled at public schools and having a worse self-perception of oral health were strongly associated with higher prevalence of dental caries in both FM and PP.

Part 2

In the second part of the study, 204 schoolchildren from second to seventh grade were examined. Of these, two were excluded due to the presence of an orthodontic expander and to the absence of all first molars. Considering the FM examination protocol performed by the gold standard examiner, the prevalence of dental caries in the studied population was 20.2% (95%CI: 14.8-26.3) while the mean DMFT was 0.32 (SD: 0.71). The comparison of PP performed by dentists with the FM examination (performed by gold standard) is showed in Table 2. It is possible to observe that all examiners obtained similar levels of caries prevalence using the PP, which was slightly higher than those obtained by the gold standard examiner. In addition, PP applied by different examiners presented higher levels of sensitivity and specificity compared to FM examination performed by the gold standard examiner.

Regarding the comparison between the PP applied by different examiners and the simulated PP examination of the gold standard examiner (Table 3), the results obtained are similar to those analyzed

Table 1

Association between dental caries prevalence (DMFT ≥ 1) according to tested protocols and independent variables in schoolchildren aged between 8 to 12 years. Pelotas, Rio Grande do Sul State, Brazil (N = 1,211).

Independent variables	n (%)	Examination protocols			
		Full mouth		Partial protocol	
		PR (95%CI)	p-value	PR (95%CI)	p-value
Gender			0.365		0.336
Male	574 (47.4)	1.00		1.00	
Female	637 (52.6)	1.10 (0.90-1.34)		1.11 (0.90-1.36)	
Age (years)			< 0.001		< 0.001
8	182 (15.0)	1.00		1.00	
9	312 (25.8)	0.98 (0.67-1.42)		0.89 (0.61-1.30)	
10	295 (24.4)	1.32 (0.93-1.89)		1.21 (0.84-1.74)	
11	259 (21.4)	1.67 (1.17-2.37)		1.58 (1.11-2.26)	
12	163 (13.5)	1.87 (1.29-2.71)		1.69 (1.16-2.48)	
Maternal schooling (years)			< 0.001		< 0.001
≥ 12	137 (11.7)	1.00		1.00	
9 to 11	365 (31.0)	1.31 (0.85-2.03)		1.54 (0.96-2.49)	
5 to 8	248 (21.1)	1.81 (1.16-2.80)		2.08 (1.28-3.36)	
≤ 4	426 (36.2)	2.16 (1.43-3.26)		2.48 (1.58-3.91)	
Family income (quartiles)			< 0.001		< 0.001
4th	146 (23.7)	1.00		1.00	
3rd	271 (26.1)	1.55 (1.10-2.19)		1.61 (1.12-2.32)	
2nd	241 (23.2)	1.80 (1.28-2.54)		1.87 (1.30-2.68)	
1st	279 (26.9)	1.99 (1.43-2.76)		2.09 (1.47-2.96)	
Plaque index (tertiles)			< 0.001		0.001
1st	436 (35.9)	1.00		1.00	
2nd	379 (31.2)	1.23 (0.95-1.60)		1.25 (0.95-1.63)	
3rd	399 (32.9)	1.64 (1.29-2.09)		1.60 (1.25-2.06)	
Type of school			< 0.001		< 0.001
Private	253 (20.9)	1.00		1.00	
Public	958 (79.1)	1.99 (1.51-2.62)		2.12 (1.57-2.85)	
Oral health self-perception			< 0.001		< 0.001
Very good/Good	404 (33.4)	1.00		1.00	
Fair/Bad	805 (66.6)	1.53 (1.25-1.86)		1.61 (1.30-1.98)	

95%CI: 95% confidence interval; PR: prevalence ratio.

Notes: (i) the level of significance for all analyses was set at 5%; (ii) bivariate Poisson regression models with robust variance.

in the previous table. Sensitivity and specificity values remained at the same level, with values considered to be excellent. Considering both positive predictive values (PPV) and the negative predictive value (NPV), it was observed that PPV values were lower, ranging from 75 to 66.7%, while NPV were higher, all being above 97%. In the analysis of the likelihood ratio, it was observed that all professionals obtained good results using the PP of examination (high values of positive likelihood ratio and lower results (< 1) of negative likelihood ratio).

Table 4 shows inter-examiner reproducibility of examiners using PP compared with gold standard. It is possible to observe that results of weighted kappa for categorical DMFT were, in general, lower (0.75, 0.70 and 0.66; respectively) than values of reproducibility obtained using dichotomous DMFT (0.71, 0.80 and 0.76; respectively). For categorical DMFT and dichotomous DMFT (considering only the presence or absence of teeth affected by caries), the professionals showed values described as substantial [16] which is acceptable for use in epidemiological studies.

Figure 1

Prevalence (%) of dental caries by tooth in schoolchildren aged between 8-12 years. Pelotas, Rio Grande do Sul State, Brazil (N = 1,211).

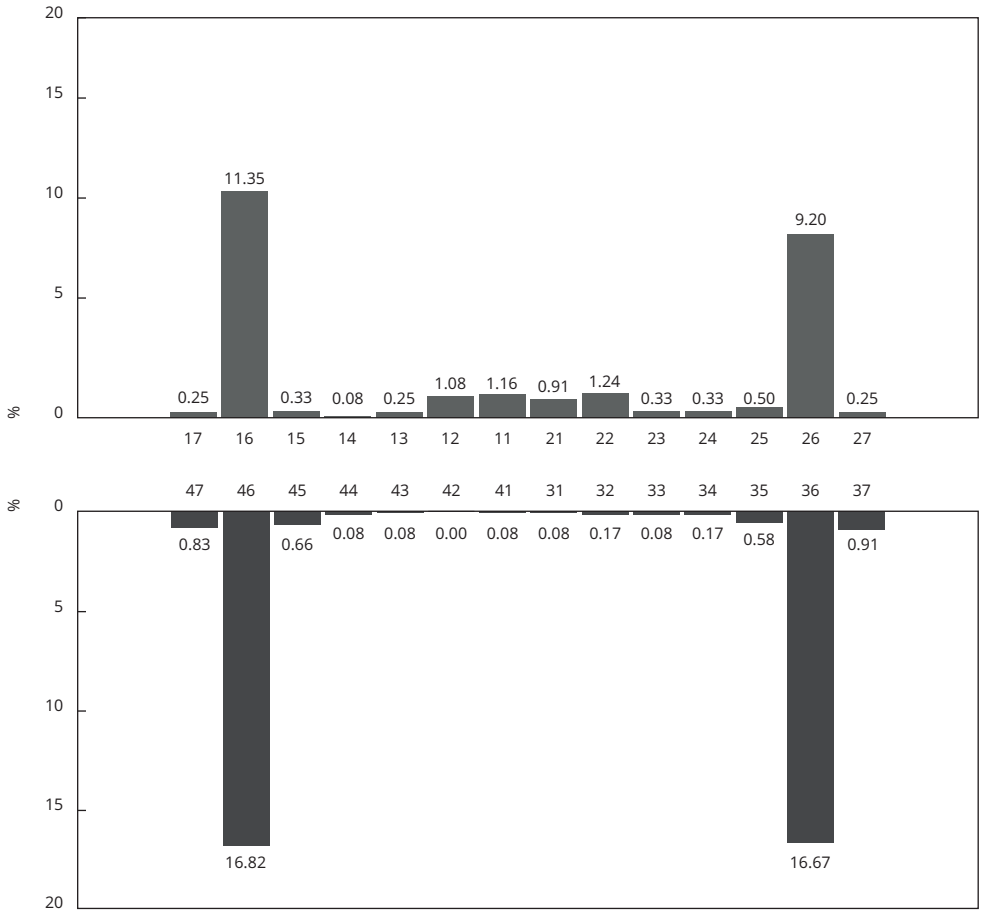

Table 2

Estimates of prevalence, sensitivity, specificity, relative and absolute bias and inflation factor for the partial protocol compared to full mouth (gold standard) examination in schoolchildren aged between 8 to 12 years. Pelotas, Rio Grande do Sul State, Brazil (N = 202).

Professional	PR (95%CI)	Sensitivity (95%CI)	Specificity (95%CI)	Absolute bias	Relative bias	Inflation factor
Gold standard	18.7 (13.7-24.9)	92.7 (80.1-98.5)	-	-1.5	-7.3	1.08
D1	21.9 (16.3-28.1)	87.5 (73.2-95.8)	94.4 (89.7-97.4)	1.7	8.4	0.92
D2	24.3 (18.5-30.8)	92.5 (79.6-98.4)	92.6 (87.4-96.1)	4.1	20.1	0.83
D3	25.1 (19.4-31.8)	90.2 (76.9-97.3)	91.4 (85.9-95.2)	4.9	24.4	0.80

95%CI: 95% confidence interval; PR: prevalence ratio.

Table 3

Validity of the partial protocol applied by dentists compared to partial examination performed by gold standard examiner in schoolchildren aged between 8 to 12 years. Pelotas, Rio Grande do Sul State, Brazil (N = 202).

Professional	Sensitivity	Specificity	PPV	NPV	LR+	LR-
D1 *	89.2 (74.6-97.0)	93.3 (88.3-96.6)	75.0 (59.7-86.8)	97.5 (93.6-99.3)	13.30	0.12
D2	94.6 (81.8-99.3)	91.5 (86.2-95.3)	71.4 (56.7-83.4)	98.7 (95.4-99.8)	11.15	0.06
D3	89.5 (75.2-97.1)	89.7 (84.0-93.9)	66.7 (52.1-79.2)	97.4 (93.4-99.3)	8.68	0.12

LR: likelihood ratio; NPV: negative predictive values; PPV: positive predictive values.

* D1: partial protocol examination performed by gold standard examiner.

Table 4

Repeatability for examination of dental caries in the first molars (DMFT) of schoolchildren aged between 8 to 12 years for dentists in relation to the gold standard examiner. Pelotas, Rio Grande do Sul State, Brazil (N = 202).

Professional	DMFT categorical		DMFT dichotomous	
	% agreement	Weighted kappa	% agreement	Weighted kappa
D1	97.1	0.75	95.5	0.71
D2	96.3	0.70	96.6	0.80
D3	95.6	0.66	95.8	0.76

Discussion

The present study showed that the PP evaluating only the first permanent molars presented a good level of accuracy, high sensitivity and specificity to estimate dental caries prevalence and that it was valid to determine associated factors and magnitude of effect measures in relation to FM examination. In general, values of at least 80% of sensitivity and specificity (sum = 160%) are acceptable for epidemiological studies. In the present study, all professionals achieved values ranging from 179.2% and 186.1%. The PP examination provided results very similar to FM examination in a smaller number of teeth. So, it may be recommended for wide epidemiological studies because it decreases examination time as well as study costs . Regarding public health, this investigated protocol is a reliable alternative for screening dental caries in populations, with potential to be employed in public health services.

The choice for assessing the status of permanent first molars through the tested protocols was due to fact that, in general, carious lesions occur first in the occlusal surface of these teeth [5,6,7] with distribution occurring homogeneously in the upper and lower arches [6]. In fact, our findings confirm that permanent first molars are widely the most affected teeth by caries in the studied age group with a symmetric distribution of caries in molars. The prevalence of 32.4% and 20.2% found in the first and second parts of the study are much lower than the prevalence found at 12 years of age in the South region of Brazil (60.3%) in a recent national survey of oral health [17]. This can be explained because the age group of our study comprised also children from 8 to 12 years of age who have mixed dentition, in which a lower prevalence of the disease might be expected.

The use of partial examination protocols in oral health epidemiological surveys is commonly adopted in periodontal outcomes studies [16,18,19,20,21] mainly because it reduces the time and labor cost and decreases patient discomfort and examiners' fatigue [17,18]. The present study found good results regarding PP's accuracy, not only to assess prevalence, but also to assess factors associated with dental caries. In this way, socioeconomic, behavioral and oral health variables were strongly associated with

the presence of disease in both FM and PP, showing that the use of PP also presented good discriminatory power. In addition, ethical issues would reinforce recommending PP in large epidemiological surveys with these objectives.

The use of a simplified and easy diagnostic method, such as the protocol evaluated in this study, highlights the possibility of a direct application of PP in public health systems, like as the Brazilian Unified National Health System (SUS). Furthermore, the use of the PP allows for a fast process of data collection to assess the target population's oral health , facilitating the organization of services, knowing demands and improving equality on how dental care is provisioned [22]. After training and calibration process and under supervision by dentists, other health professionals could perform screening for dental caries in high population levels more easily than with FM protocols. These health professionals using screening tools could contribute to the qualification of health assistance and promote the best use of human resources available in the public sector [10,20]. This possibility is supported by Saintrain & Vieira's study [22], who demonstrated that non-dental personnel (community health agents) of health teams from the SUS are able to screen oral health conditions in an individual and collective basis by means of a Community Oral Health Indicator. Likewise, Macey et al. [23] showed that hygiene therapists in the United Kingdom might be able to perform screening for dental caries and periodontal disease.

Deploying other health professionals to assist dentists with screening for oral conditions is not well accepted by some dentists, which they wrongly perceive as overlapping to their own activities. In several parts of the world, there is a shortage of dentists in relation to the population and this highly qualified workforce should be directed toward more complex activities [24]. Therefore, from a public health standpoint, the use of the PP could facilitate screening and the monitoring of dental caries by auxiliary trained personnel, especially among the most disadvantaged populations, which are the most affected by the disease. The present findings have high internal validity, given the inter-examiner agreement obtained in the calibration process. The high rate of children enrolled in primary school in this age group, together with the sampling technique, allows for data extrapolation for children of the same age in the city of Pelotas and others with similar regional and development characteristics. The present findings were based on analysis of the tooth as a whole rather than analyzing each tooth surface (DMFS), which allows for a better estimate of the severity of the disease as well as more precise monitoring of lesion development in longitudinal follow-ups. In this way, the use of PP examination should be viewed with caution in longitudinal studies. Also, as PP originated from the same FM examination in the first part of study, it was not possible to assess the specificity of protocol in this sample. However, the specificity was assessed in the second part of this study. Regarding the age of participants, our data is applicable only to children from 8 to 12 years of age. Nevertheless, considering that clinical manifestation of dental caries starts generally in first molars, it is probable that to estimate prevalence of the disease, PP would present good results for other age groups. On the other hand, in older ages, an assessment of the disease's severity would be useful to screen individuals. In this case, the examination of just four teeth in mouth can result in a severe underestimate of disease severity.

It was concluded that the use of PP in this study demonstrated accuracy and reliability to assess the prevalence of dental caries and its association with demographic and behavioral factors in children between 8 and 12 years.

Contributors

E. R. Dutra participated in concepting and study design, data acquisition, and analysis and interpretation; wrote and reviewed the manuscript; approved the final version. L. A. Chisini, M. G. Cademartori, and L. J. C. Oliveira participated in acquisition, analysis and interpretation of data; wrote and reviewed the manuscript; approved the final version. F. F. Demarco participated in study design and data analysis and interpretation; wrote and reviewed the manuscript; approved the final version. M. B. Correa participated in concepting and study design and data analysis and interpretation; wrote and reviewed the manuscript; approved the final version. All authors are responsible for all aspects of the work.

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Resumo

O estudo teve como objetivo testar a acurácia e a confiabilidade de um protocolo parcial (PP) para exame oral, envolvendo os primeiros molares permanentes. O estudo transversal foi realizado em duas etapas. Primeiro, foi feito um estudo transversal em uma amostra representativa de 1.211 crianças, usando o índice CPOD com um protocolo de boca completa (BC). O PP foi simulado a partir de dados de BC, usando apenas os dados dos primeiros molares permanentes. A segunda etapa foi realizada em 202 crianças examinadas por um examinador de padrão de ouro (BC) e três odontólogos usando o PP para avaliar a confiabilidade do mesmo. A acurácia do PP foi avaliada pela sensibilidade, especificidade e valores preditivos positivos e negativos. A confiabilidade inter- examinador, comparada com o examinador de padrão de ouro, foi avaliada através do índice kappa ponderado. A prevalência de cárie dentária, medida pelo índice CPOD, foi 32,4%, comparado com 30,2% para o PP. O PP apresentou sensibilidade alta (93,1%; IC95%: 91,5-94,5), com magnitude semelhante nas medidas de associação dos fatores investigados. Quando comparados com o exame de BC (padrão de ouro), todos os examinadores obtiveram níveis altos de sensibilidade e especificidade (em torno de 90%). Os valores preditivos negativos foram mais altos do que os valores preditivos positivos para os examinadores. O estudo mostrou que o protocolo parcial envolvendo os primeiros molares permanentes é acurado e confiável enquanto ferramenta de triagem para avaliar a prevalência de cárie dentária e fatores associados em escolares.

Cárie Dentária; Diagnóstico Bucal; Confiabilidade dos Dados; Criança

Resumen

El objetivo de este estudio fue probar la precisión y fiabilidad de un protocolo parcial (PP) de exámenes orales, incluyendo los primeros molares permanentes. Este estudio transversal se llevó a cabo en dos etapas. En primer lugar, se desarrolló un estudio transversal con una muestra representativa de 1.211 niños, usando el DMFT-index en un protocolo para toda la boca (FM por sus siglas en inglés). El PP se simuló con datos del FM, usando solo información de los primeros molares permanentes. La segunda parte se realizó con 202 niños examinados por un examinador ideal (FM) y tres dentistas, usando el PP para evaluar su fiabilidad. La precisión del PP se evaluaron por sensibilidad/especificidad/valores predictivos positivos y negativos. La fiabilidad interexaminadores, en comparación con el examinador ideal, fue evaluada usando un índice kappa ponderado. La prevalencia de caries dental observada, usando el índice DMFT fue de un 32,4% y un 30,2% respecto al PP. El PP presentó una alta sensibilidad (93,1%; IC95%: 91,5-94,5), mostrando una magnitud similar de medidas de asociación para todos los factores asociados investigados. Cuando se comparó con el estándar ideal de examen para la FM, todos los examinadores obtuvieron parámetros altos de sensibilidad y especificidad (sobre un 90%). Los valores predictivos negativos eran más altos que los valores predictivos positivos para los examinadores. Este estudio mostró que este protocolo parcial, incluyendo los primeros molares permanentes, es preciso y fiable como herramienta de detección para evaluar la prevalencia de caries dental y sus factores asociados en niños con edad escolar.

Caries Dental; Diagnóstico Bucal; Exactitud de los Datos; Niño

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