

Analysis of oral health indicators in the Metropolitan Region of Curitiba - Paraná state: advances and setbacks between 2015-2017**Análise dos indicadores de saúde bucal na Região Metropolitana de Curitiba-PR: avanços e retrocessos entre 2015-2017****Análisis de los indicadores de salud bucal en la Región Metropolitana de Curitiba-PR: avances y retrocesos entre 2015-2017****Received: 17/03/2020****Approved: 28/08/2020****Published: 03/10/2020****Larissa Leonarda Pinto¹**
Gabriela Fonseca de Souza²
Lara Cubis de Lima³
Rafael Gomes Ditterich⁴

This study aimed to assess the relationship between oral health indicators and coverage by oral health teams. This is a quantitative and descriptive study, considering the cities in the metropolitan region of Curitiba/PR, Brazil, corresponding to the years 2015 to 2017, regarding coverage in the Family Health Strategy and the main health indicators. Pearson's correlation test was performed. As for the highest coverage, between 2015 and 2017, respectively, it was observed: first programmatic consultation, ($p=0.017$, $r=0.503/p=0.021$, $r=0.490/p=0.021$, $r=0.477$); supervised brushing ($p<0.001$, $r=0.871/p=0.034$, $r=0.454/p<0.001$; $r=0.753$); and tooth extraction ($p<0.001$, $r=0.787/p<0.001$, $r=0.735/p<0.001$; $r=0.772$). It was found that Constitutional Amendment 241/2016 caused a decrease in the coverage of oral health teams, affecting preventive actions.

Descriptors: Health status indicators; Family Health Strategy; Health information system; Oral health.

Este estudo objetivou avaliar a relação entre os indicadores de saúde bucal e cobertura pelas equipes de saúde bucal. Trata-se de um estudo quantitativo e descritivo, considerando as cidades da região metropolitana de Curitiba/PR, correspondente aos anos 2015 a 2017, quanto a cobertura na Estratégia Saúde da Família e os principais indicadores de saúde. Realizou-se teste de correlação de Pearson. Quanto as maiores coberturas, entre 2015 a 2017 respectivamente observou-se: primeira consulta programática, ($p=0,017$, $r=0,503/p=0,021$, $r=0,490/p=0,021$, $r=0,487$); escovação supervisionada ($p<0,001$, $r=0,871/p=0,034$, $r=0,454/p<0,001$; $r=0,753$); e exodontia ($p<0,001$, $r=0,787/p<0,001$, $r=0,735/p<0,001$; $r=0,772$). Verificou-se que a Emenda Constitucional 241/2016, causou diminuição na cobertura das equipes de saúde bucal, afetando as ações preventivas.

Descritores: Indicadores Básicos de Saúde; Estratégia de Saúde da Família; Sistemas de Informação em Saúde; Saúde Bucal.

Este estudio tuvo por objeto evaluar la relación entre los indicadores de salud bucal y la cobertura por los equipos de salud bucal. Se trata de un estudio cuantitativo y descriptivo, considerando las ciudades de la región metropolitana de Curitiba/PR, Brasil, correspondiente a los años 2015 a 2017, en relación con la cobertura en la Estrategia Salud de la Familia y los principales indicadores de salud. Se realizó la prueba de correlación de Pearson. En relación a las coberturas más altas, entre 2015 y 2017, respectivamente, se observó que: primera consulta programática, ($p=0,017$, $r=0,503/p=0,021$, $r=0,490/p=0,021$, $r=0,487$); cepillado supervisado ($p<0,001$, $r=0,871/p=0,034$, $r=0,454/p<0,001$; $r=0,753$); y exodoncia ($p<0,001$, $r=0,787/p<0,001$, $r=0,735/p<0,001$; $r=0,772$). Se verificó que la Enmienda Constitucional 241/2016, causó una disminución en la cobertura de los equipos de salud bucal, afectando las acciones preventivas.

Descriptor: Indicadores de salud; Estrategia de Salud Familiar; Sistemas de información en salud; Salud bucal.

1. Dentist surgeon. Master's student in Public Health from the Universidade Federal do Paraná (UFPR), Curitiba, PR, Brazil. ORCID: 0000-0001-5268-0640 E-mail: pllarileonarda@gmail.com

2. Dentist surgeon. Master's student in Pediatric Dentistry at UFPR, Curitiba, PR, Brazil. ORCID: 0000-0002-8040-8553 E-mail: gbfonsecaledesouza@gmail.com

3. Dentist surgeon. Specialist in Collective Health. Specialist in Clinical Management in Health Regions. Master's student in Public Health at UFPR, Curitiba, PR, Brazil. ORCID: 0000-0001-6530-1355 E-mail: lara.cubis@hotmail.com

4. Dental surgeon. Specialist in Public Health Dentistry. Specialist in Health Management. Master and PhD in Dentistry. Associate Professor of the Postgraduate Program in Public Policy at UFPR, Curitiba, PR, Brazil. ORCID: 0000-0001-8940-1836 E-mail: prof.rafaelgd@gmail.com

INTRODUCTION

In order to change the reality of health care offered by the public health system in Brazil, previously based on curative and mutilating procedures, in 1994 the Family Health Program, now known as the Family Health Strategy (FHS), was created. The FHS reorganized the care model, reaffirming the principles and values of health promotion and proposing action based on a broad vision of family health in the territory¹. Oral health, in turn, was inserted in the FHS by Ministerial Decrees 1,444 of 2000 and 267 of 2001².

In 2004, the guidelines of the National Health Policy (NHP) - *Brasil Sorridente* - were established, with a view to consolidating the principles of care, equity and integrality through the Health Care Networks (HCN), designed to direct healthcare services to the identification of the needs of the population, strengthening of primary care and articulation with other levels of care. Significant progress has been made in the years of this policy, both in access to services and in the epidemiological impact³.

With Dentistry standing out in the Brazilian public health scenario, there was an increase in the supply and coverage of dental services in the period from 2003 to 2006 and its conservation in the following years (2007 to 2014). In the period between 2006 and 2014, population coverage by oral health teams (OHT) ranged from 34 to 40%, 200% more compared to 2002.

This advance is linked to the transfer of funds from the Union to the states and municipalities of the federation, which between 2003 and 2014 increased by 10.9 times; at the end of 2014, the transfer to OHT and FHS reached 721.7 million reais⁴. In this context, the "New Tax Regime" proposed and approved by the Constitutional Amendment Proposal 241, now Constitutional Amendment 95, in 2016, established a cap on spending on primary health care, freezing it by 20 years. Consequently, the lower availability of resources reflects a greater difficulty in guaranteeing universal access to health services⁵.

Despite the advances, it is still possible to see inequality in the services offered⁴. In order to identify the problems and guide the decision-making of health managers, health information systems are used, allowing to outline the current oral health care model and being a valuable component for the study of the population's needs, or that is, a useful tool in the organization of oral health in municipalities^{6,7}. Therefore, this study aimed to assess the relationship between oral health indicators and coverage by oral health teams.

METHOD

This was a quantitative and descriptive survey using secondary data, considering the years 2015, 2016 and 2017. The region delimited for analysis was the Metropolitan Region of Curitiba. According to the Coordination of the Metropolitan Region of Curitiba (*Coordenação da Região Metropolitana de Curitiba - COMEC*), this area consists of 29 municipalities - Adrianópolis, Agudos do Sul, Almirante Tamandaré, Araucária, Balsa Nova, Bocaiúva do Sul, Campina Grande do Sul, Campo do Tenente, Campo Largo, Campo Magro, Cerro Azul, Colombo, Contenda, Curitiba, Doutor Ulysses, Fazenda Rio Grande, Itaperuçu, Lapa, Mandirituba, Piên, Pinhais, Piraquara, Quatro Barras, Quitandinha, Rio Branco do Sul, Rio Negro, São José dos Pinhais, Tijucas do Sul and Tunas do Paraná⁸.

The Oral Health indicators used in this research were: first programmatic dental consultation, supervised brushing and deciduous and permanent tooth extractions, which were obtained from the database of the Outpatient Information System of the Unified Health System (*Sistema de Informação Ambulatorial do Sistema Único de Saúde SIA-SUS*), with the aim of based on consolidated data, to carry out the comparative descriptive analysis of oral health indicators⁹, in order to assess whether the freezing of funds for health had a short-term impact on primary health care. For each of these indicators, the following SIA-SUS procedures were used, as described below:

- a) First Programmatic Dental Consultation: SIA-SUS Code 0301010153;
- b) Supervised Dental Brushing Collective Action: Code SIA-SUS 0101020031;
- c) Deciduous and permanent extractions. SIA-SUS code 0414020120 and 0414020138, respectively.

The ratio was calculated between the number of procedures presented for each of the oral health indicators from the years 2015 to 2017 and the number of inhabitants of each of the 29 municipalities of the Second Regional Health of Paraná (2nd RH-PR). To consult the number of inhabitants per municipality, the estimate of the Federal Court of Accounts (FCA) 10 was used.

As for the Coverage of Oht in the FHS, data from the support room for the strategic management of SUS were used. The number of FHS Oht teams in modalities I and II were quantified. Then, an Oht for 3000 people was projected, as recommended by the Government¹¹ and the recommended amount and the existing number of FHS teams were compared with Oht. The municipalities of the 2nd RH-PR were classified into five service ranges, considering the percentage reached of the relationship between FHS teams with existing Oht and those recommended by municipality:

- Range 01: $\leq 25\%$;
- Range 02: $> 25\%$ and $\leq 50\%$;
- Range 03: $> 50\%$ and $\leq 75\%$
- Range 04: $> 75\%$ and $\leq 100\%$;
- Range 05: $> 100\%$

The existence of a correlation between oral health indicators and the coverage of Oht in the FHS was analyzed. For this purpose, a quantitative statistical analysis was performed, with the aid of the BioEstat 5.3 program, in which Pearson's correlation test was performed, with a 95% significance level. The value obtained for r for the evidence of association was evaluated using the classification of Figueiredo Filho and Silva Júnior¹²:

- If $r = 1$, then there is a strong relationship between the two variables;
- If $r = 0$, there is no relationship between the two variables;
- If $0.10 < r < 0.30$, there is a weak relationship between the two variables;
- If $0.40 < r < 0.60$, there is a moderate relationship between the two variables;
- If $0.70 < r < 1$, there is a strong relationship between the two variables.

RESULTS

The final sample consisted of 26 municipalities (out of 29), two of which were excluded due to inconsistency in the data recorded in the SIA-SUS, and one for not presenting data regarding Oht coverage.

The ratios between the number of procedures for each of the oral health indicators for the years 2015 to 2017 and the number of inhabitants of each of the 29 municipalities of the 2nd RH-PR are shown in Table 1. In relation to the first programmatic dental consultation, when comparing the years 2015 and 2017 it was possible to observe that the municipalities that presented growth in programmatic consultations (inhab./year) were Balsa Nova and Tijucas do Sul (13.8% and 10.2%, respectively). Agudos do Sul, followed by Campo Magro, recorded a greater decrease in the ratio of this inhab./year procedure (9.5% and 8.9%, respectively).

Regarding supervised tooth brushing, it was found that for this oral health indicator there was a significant decrease between the years 2015 and 2017, and of the 22 municipalities, 3 decreased by up to 10% (Piên, Piraquara and São José dos Pinhais), 4 between 10 and 20% (Campo Largo, Campo Magro, Fazer Rio Grande and Rio Negro) and 8 between 20 and 40% (Agudos do Sul, Araucária, Balsa Nova, Campo do Tenente, Curitiba, Itaperuçu, Quatro Barros and Rio Branco southern); Adrianópolis demonstrated the greatest reduction in the

performance of the procedure (80.2%). Some municipalities recorded zero procedures for this indicator: Campina Grande do Sul in 2015, Cerro Azul in 2016 Campo do Tenente, Cerro Azul, Contenda and Quitandinha in 2017.

Between 2015 and 2017, Adrianópolis was the municipality that had the greatest increase in extractions (7.5%) and Tunas do Paraná had the greatest reduction (14.3%).

The Oht coverage in the GHS in the 2nd RH-PR is expressed as a percentage of population coverage of the teams by municipality in the three years studied in table 1.

Table 1. Oral health indicators and the number of inhabitants/year and coverage of Oht in the 2nd RH-PR, 2015-2017.

Towns	First programmatic appointment/inhabitants			Supervised brushing/inhabitants			Tooth extraction/inhabitants			Coverage Oht (%)		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Adrianópolis	0.175	0.130	0.148	2.255	0.163	1.453	0.193	0.124	0.268	100%	100%	100%
Agudos do Sul	0.121	0.007	0.026	0.479	0.197	0.178	0.036	0.018	0.03	33%	0%	25%
Almirante Tamandaré	0.038	0.035	0.038	0.009	0.049	0.011	0.020	0.014	0.017	5%	5%	5%
Araucária	0.122	0.132	0.112	0.543	0.476	0.229	0.046	0.046	0.044	36%	35%	30%
Balsa Nova	0.167	0.216	0.304	0.961	0.211	0.696	0.081	0.086	0.088	80%	80%	80%
Campina Grande do Sul	0.031	0.013	0.029	0.000	0.005	-	0.010	0.007	0.018	40%	40%	40%
Campo do Tenente	0.082	0.077	0.114	1.138	0.994	0.82	0.059	0.059	0.093	100%	100%	100%
Campo Largo	0.050	0.055	0.061	0.248	0.207	0.074	0.021	0.026	0.028	40%	45%	42%
Campo Magro	0.108	0.054	0.018	0.067	0.029	0.005	0.040	0.043	0.049	30%	30%	30%
Cerro Azul	0.004	0.004	0.001	0.028	0.000	-	0.088	0.085	0.034	67%	83%	67%
Colombo	0.106	0.212	0.16	0.071	0.138	0.131	0.025	0.029	0.018	33%	33%	5%
Contenda	0.103	0.088	0.041	0.061	0.007	-	0.048	0.042	0.021	17%	17%	17%
Curitiba	0.096	0.095	0.095	0.442	0.306	0.107	0.029	0.027	0.028	34%	34%	32%
Fazenda Rio Grande	0.035	0.017	0.009	0.157	0.041	0.002	0.000	0.006	0.003	23%	19%	19%
Itaperuçu	0.055	0.029	0.021	0.338	0.168	0.006	0.000	0.004	0.011	33%	33%	33%
Lapa	0.052	0.046	0.064	0.044	0.027	0.057	0.048	0.033	0.035	25%	25%	12%
Piên	0.032	0.035	0.02	0.304	0.379	0.294	0.067	0.052	0.034	25%	25%	25%
Pinhais	0.024	0.023	0.037	0.379	0.521	0.447	0.023	0.033	0.033	9%	14%	14%
Piraquara	0.057	0.050	0.087	0.038	0.001	0.022	0.032	0.027	0.043	26%	25%	39%
Quatro Barras	0.150	0.122	0.091	0.375	0.271	0.014	0.065	0.064	0.042	50%	50%	50%
Quitandinha	0.045	0.027	0.009	0.042	0.011	-	0.075	0.070	0.034	43%	43%	43%
Rio Branco do Sul	0.052	0.046	0.049	0.556	0.498	0.166	0.038	0.029	0.024	36%	36%	27%
Rio Negro	0.142	0.137	0.136	0.413	0.587	0.262	0.052	0.067	0.048	33%	33%	33%
São José dos Pinhais	0.050	0.052	0.056	0.097	0.094	0.032	0.025	0.024	0.024	8%	9%	8%
Tijucas do Sul	0.104	0.213	0.207	0.197	0.250	0.438	0.111	0.125	0.102	50%	50%	67%
Tunas do Paraná	0.067	0.071	0.017	1.934	0.487	0.232	0.220	0.094	0.078	100%	67%	67%

Graph 1 and Table 2 show the comparative evolution, by coverage range, between the number of Family Health teams with Oht in the 26 municipalities covered in this study in the years 2015, 2016 and 2017. In the analyzed time interval, the number number of municipalities included in Line 1 increased in 2016 and remained stable in 2017. Contrary to what happened with the first line, Line 2, composed of the largest number of municipalities during the studied period, when compared to the other bands, presented reduction of 4 municipalities, from 14 in 2015 to 11 in 2017. The percentage of municipalities classified in Line 3 became 3.8% in 2015

and 15.4% in 2017. Line 4 had a decrease in one municipality. No municipality was included in Line 5.

Graph 1. 2^a RH-PR municipalities classified by ranges according to Oht coverage in the years 2015 to 2017. 2^aRH-PR, 2015-2017.

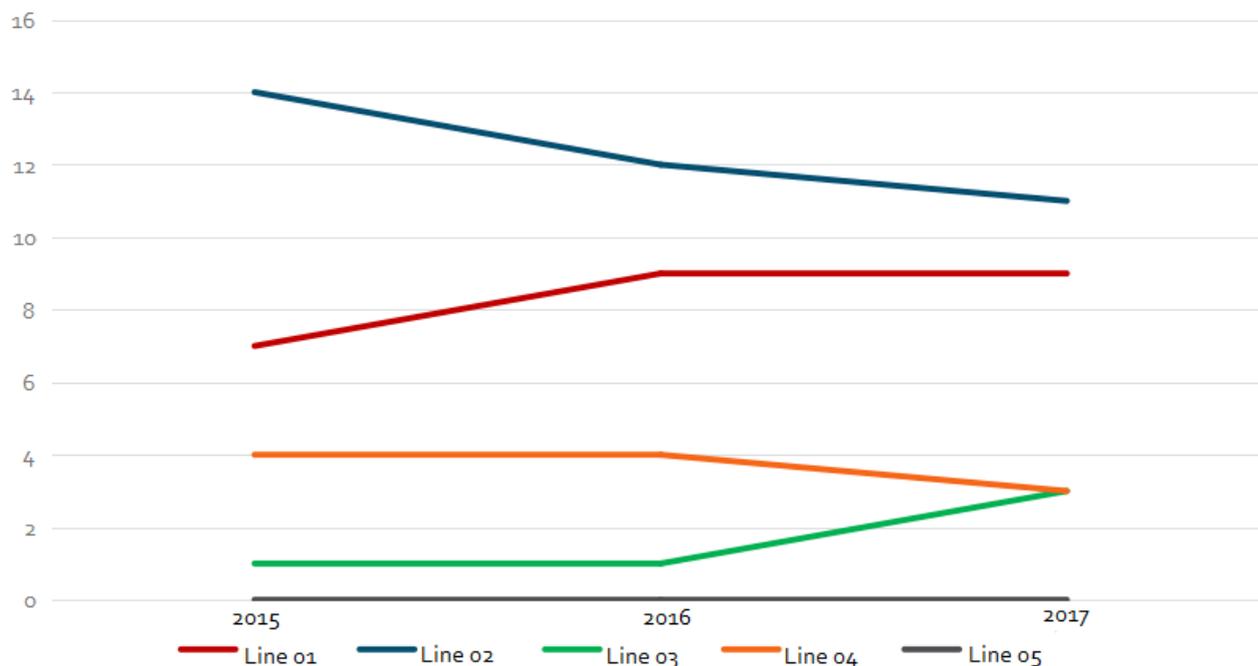
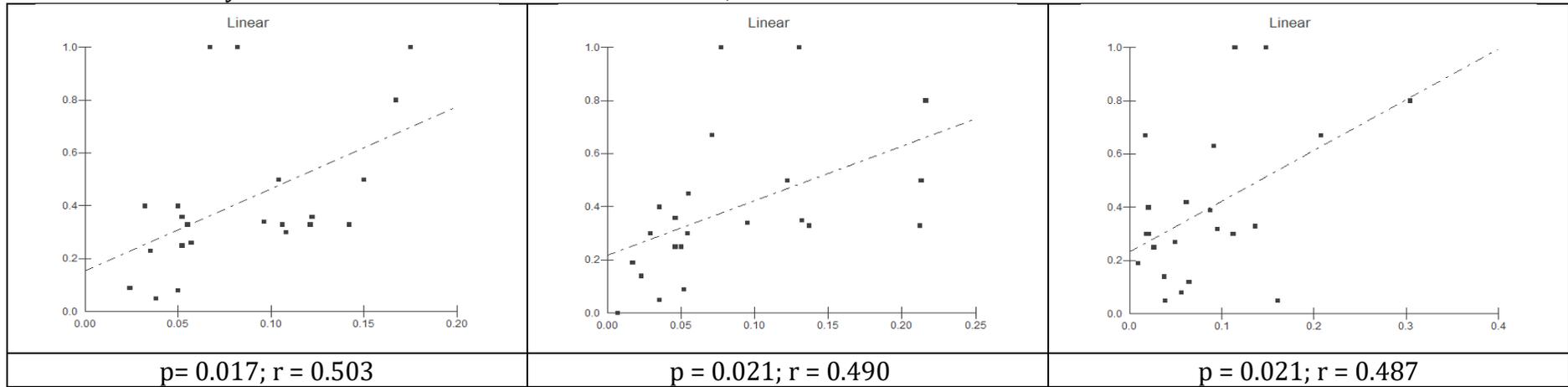


Table 2. Oral health service ranges by number of municipalities inhabitants/year and coverage of esB from 2^aRS-PR, 2015-2017.

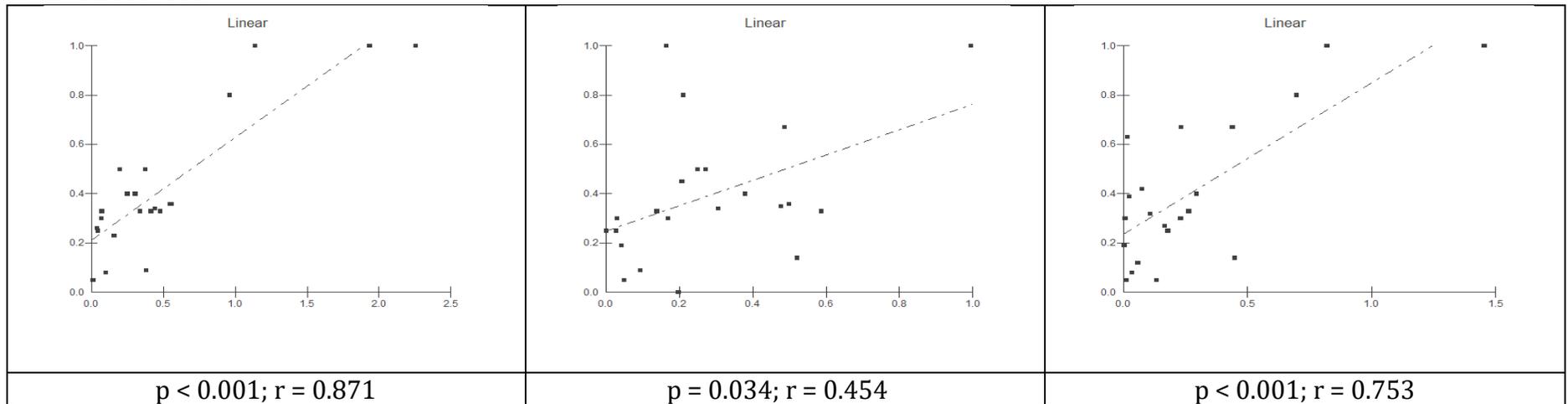
Line	2015	2016	2017
Line 1	7 (26.9%)	9 (34.6%)	9 (34.6%)
Line 2	14 (53.8%)	12 (46.1%)	11 (42.3%)
Line 3	1 (3.8%)	1 (3.8%)	3 (11.5%)
Line 4	4 (15.4%)	4 (15.4%)	3 (11.5%)
Line 5	-	-	-
Total	26	26	26

Correlating Oht coverage in the FHS, in the 2nd RH-PR, to the oral health indicators, a significant association was observed for the three years. For the first programmatic consultation, the relationship was moderate ($p = 0.017$; $r = 0.503$ in 2015, $p = 0.021$; $r = 0.490$ in 2016 and $p = 0.021$; $r = 0.477$ in 2017), the greater the coverage, the greater the number of consultations (Graph 2). As for supervised brushing, there was a strong relationship in 2015 ($p < 0.001$; $r = 0.871$), moderate in 2016 ($p = 0.034$; $r = 0.454$) and again strong in 2017 ($p < 0.001$; $r = 0.753$) (Graph 3). In the three years evaluated, there was a strong relationship between Oht coverage in the FHS and the number of extractions ($p < 0.001$; $r = 0.777$ in 2015, $p < 0.001$; $r = 0.735$ in 2016 and $p < 0.001$; $r = 0.772$ in 2017) (Graph 4).

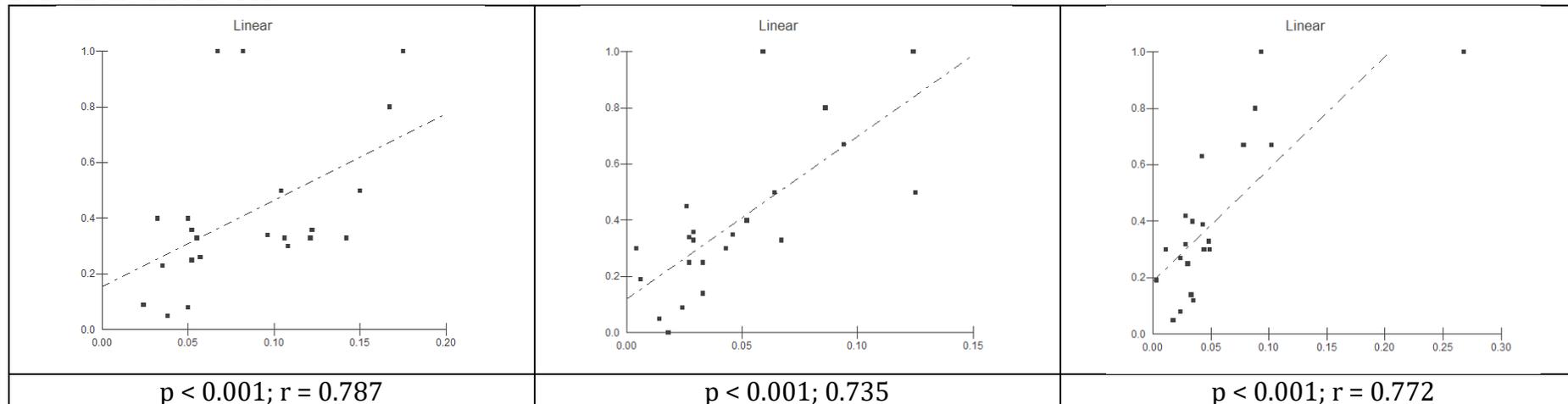
Graph 2. Correlation between coverage of the Oral Health Team in the Family Health Strategy with the first programmatic dental consultation in the years 2015-2017 in the 2nd RS-PR. 2^aRS-PR, 2015-2017.



Graph 3. Correlation between Oral Health Team coverage in the Family Health Strategy with supervised brushing in the years 2015-2017 in the 2nd RS-PR.



Graph 4. Correlation between coverage of the Oral Health Team in the Family Health Strategy with average extraction in the years 2015-2017 in the 2nd RS-PR.



DISCUSSION

This study identified a significant association between Oht coverage in the FHS and oral health indicators. It was found that the largest number of first programmatic consultations occurred in the municipalities whose coverage was between 76 and 100% in the years evaluated. The greatest growth in this indicator took place in Balsa Nova, which had coverage of 80% from 2015 to 2017. This association highlights the relevance of reorganizing primary health care, considering access and provision of oral health services¹³.

The municipality of Cerro Azul showed the lowest values, although it fits in the coverage Line 3 (> 50% and ≤ 75%), assuming that the inversion in the logic of care of prevention and promotion of oral health for a care model prioritizes assistance regardless of the increase in coverage, showing the fragility of this indicator in the face of changing management or coordination of oral health.

The same pattern between Oht coverage and supervised brushing was observed, with the municipalities with the highest coverage (Line 4) showing the highest value of the indicator and the cities with the lowest coverage (Lines 1 and 2) registered the lowest results. These results corroborate with another study¹⁴, in which it was identified that municipalities with less performance of collective procedures do not consider them relevant in the oral health care process of their population.

In relation to tooth extractions, the municipalities included in lane 4 had the highest indicator, except in the year 2016, in which Tijucas do Sul (Line 2) expressed the highest number. These data reflect the health model prioritized by the municipality, whether it is aimed at a mutilating or conservative approach; it can also be considered that the cultural characteristics of the population covered interfere in the practice of the indicator, justifying the highlight of Tijucas do Sul. That is, this being one municipality among those who most practice tooth extraction (since in 2016, tooth extraction and coverage by Oht showed a strong relationship); therefore, the large number of dental extractions in Tijucas do Sul in 2016 can be justified by the probable cultural need of this population⁷.

The profile of this indicator may also reflect the population's lack of access to dental services, generating a repressed demand for tooth extractions, due to the consequences of the natural history of dental caries, approach adopted by professionals, lack of prioritization by municipalities in investment in long-term preventive actions and in dental materials and equipment to ensure a more conservative practice, in addition to the expectations that some communities have in relation to oral aesthetics, which they consider adequate for the extraction of natural teeth and the installation of full dentures¹⁵.

As for population coverage by the FHS, a study demonstrated that the expansion of this health care model had important impacts on the health of the Brazilian population, including from facilitated access to health services to the reduction of unnecessary hospitalizations¹⁶. Regarding oral health, it appears that the presence of Oht in the FHS improved access to dental services¹⁷, as well as the oral health of the population¹⁸.

The sustainability and development of the FHS are directly linked to State investment¹⁹, thus, Constitutional Amendment 241, approved in 2016 and which freezes investments in health for 20 years, will bring losses of approximately R \$ 433 billion until 2036²⁰ and will directly affect the maintenance and operation of Oht in the FHS. Immediately, it is possible to observe that the federal transfer from fund to fund for oral health had a sharp reduction between 2017 and 2018, having been R \$ 1,102,424,000.46 and R \$ 541,746,947.93 respectively. In other words, there was a 50% cut in the interval of one year²¹.

The present study demonstrated that, in the short term, there was a tendency to decrease the coverage of Oht by FHS between the years 2015 and 2017 in the 2nd RH-PR (reduction of the profile of municipalities with coverage ≥ 50%); the lower coverage significantly affected the practice of health promotion in this period, since the Oht coverage and the supervised brushing indicator show a strong relationship in the years mentioned.

This fact was confirmed for the municipalities of Agudos do Sul, Araucária, Curitiba, Rio Branco do Sul and Tunas do Paraná. The same is observed in the general context of the country, since in recent years collective actions to prevent oral diseases, including supervised brushing, have reached a much smaller portion of the population²².

There are also municipalities whose coverage by OHT has not changed in this period, but which showed a significant drop in the performance of supervised brushing, such as Adrianópolis, referring to the conclusion that the efforts of the teams started to have a curative and non-educational focus on health. In addition, since the other indicators (first programmatic consultation and extraction) are related to coverage by OHT, they are also threatened. Therefore, it is clear that the freeze on public health expenditures, especially with OHT in the FHS, brings returns in health gains, directs the system to its scrapping and prevents the reduction of inequalities^{5,15,22}.

Just as the inclusion of OHT in the FHS generated important advances, as it put in place a health system aimed at universality, comprehensiveness and equity, the NHP was favorable for the insertion of dentistry in SUS. With the creation of the *Brasil Sorridente* policy, the largest public oral health policy in the world²³, the federal government assumed the duty to stimulate the expansion of the offer of oral health services in municipalities and states, creating specific financing lines for the creation of new OHT for construction and implementation of secondary and tertiary care centers, among other actions³.

Considering the period of economic and political crisis that Brazil is experiencing and that the outcome of a public policy is related to the characteristics of the service providers that practice it and to the twinning between a transformative government project, the government's capacity to conduct the process and its governability²⁴, it is necessary for *Brasil Sorridente* to become a policy of the State and not of successive governments³.

However, the analysis of secondary data, although easily used to characterize the place of service, presents problems in data registration - such as over and under registration, revealing the need for better training for those responsible for entering information in the SIA-SUS and greater constancy in the data. data entry in the system⁷. For example, we can mention the municipality of Adrianópolis, which recorded 2,255 and 1,453 brushing supervised by inhabitant in 2015 and 2017, respectively; while Campina Grande do Sul recorded zero procedures for this indicator.

There is evidence that the registration of collective actions presented a greater problem in the registry when compared to standard clinical procedures, being inserted into the system as an individual procedure, instead of individual/month, as defined in the SIA-SUS manual⁶.

Corroborating other studies¹³⁻²⁵, this type of study is relevant for planning actions to transform the mutilating approach, expressed by extractions, into a more educational and conservative behavior. In view of the consequences that the budget deficit foreseen for the next 18 years will bring to SUS, it is necessary that there be a positioning of public health scholars, service providers and SUS users in order to counteract the setback of the rights conquered until then.

CONCLUSION

After more than a decade of increased investments in Oral Health in SUS, there was a significant introduction and expansion of OHT in the FHS. Analyzing the data of the municipalities, through the health information system SIA-SUS, it was possible to observe that there is an association between the OHT coverage and the oral health indicators (first programmatic consultation, supervised brushing and extractions) in the 2nd Health Regional of the Paraná in 2015, 2016 and 2017 - the higher the coverage by OHT, the higher the values of the indicators.

However, in the coverage of OHT in the studied area, a decrease was observed in general. This fact immediately and significantly affected oral health education actions and also threatens

to reduce other indicators. However, one must take into account the limitations of the study, which are related to the quality of information obtained, considering the obstacles of the data inserted in the Health Information Systems.

On the other hand, the present study is relevant to assist in planning actions that make primary care in oral health increasingly conservative and less mutilating. In addition, it warns of the need for positioning to avoid retrogression of the advances obtained for SUS.

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CONTRIBUTIONS

Larissa Leonarda Pinto and **Gabriela Fonseca de Souza** collaborated in the design of the study and its design, data collection and analysis and writing. **Lara Cubis de Lima** participated in the review. **Rafael Gomes Ditterich** contributed to the design and review.

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