

Oral health services in primary care: a study in southern Brazil

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ABSTRACT

The evaluation of oral health services is an essential component of surveillance efforts aimed at improving health indicators and the quality of care. **Aim:** The aim of this cross-sectional study was to describe the characteristics of the oral healthcare work process in primary care settings in Porto Alegre, a major city in southern Brazil. **Materials and Method:** Data on patient profiles and process evaluation components were provided by the Porto Alegre Primary Healthcare Board. An electronic questionnaire was administered to dentists to assess the structure components. Data were classified into three modules: patient profile (sex and age), structure (human resources), and process (actions and procedures). Descriptive statistical analyses were conducted, including the calculation of absolute and relative frequencies. **Results:** In 2022, a total 414,682 dental appointments were recorded, the majority involving women and individuals aged 35–59 years. Most dentists were young women, primarily specialized in collective health. The process analysis highlighted a strong focus on preventive and health promotion actions, although fluoride applications, sealants, and cariostatic agents were underutilized. Composite resin restorations in permanent teeth were common. Dental emergencies accounted for 17% of cases, and 95% of surgical procedures consisted of extractions and sutures. Additionally, dentists performed integrative practices and other activities, such as rapid testing and vital sign measurements, particularly in response to the COVID-19 pandemic. **Conclusions:** The findings of this study are intended to inform strategies and service management aimed at improving oral health care in the primary care setting of Porto Alegre.

Keywords: primary healthcare - health services administration - oral health - dental care

Serviços de saúde bucal na atenção primária: uma análise em uma grande cidade do sul do Brasil

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RESUMO

A avaliação dos serviços de saúde bucal é um componente essencial dos esforços de vigilância que visam melhorar os indicadores de saúde e a qualidade do atendimento. **Objetivo:** Estudo transversal teve como objetivo descrever as características do processo de trabalho em saúde bucal na atenção primária em Porto Alegre, Rio Grande do Sul, Brasil. **Materiais e Método:** Os dados sobre o perfil de pacientes e de componentes da avaliação de processos foram fornecidos pela Diretoria de Atenção Primária à Saúde de Porto Alegre. Questionário eletrônico foi aplicado aos dentistas para avaliar o componente estrutura. Os dados foram categorizados em três módulos: perfil do paciente (sexo e idade), estrutura (recursos humanos) e processo (ações e procedimentos). Foram conduzidas análises estatísticas descritivas, incluindo o cálculo de frequências absolutas e relativas. **Resultados:** Em 2022, um total de 414.682 consultas odontológicas foram registradas, com a maioria envolvendo mulheres e indivíduos com idade entre 35 e 59 anos. A maioria dos dentistas eram mulheres jovens, e destacou-se a especialização em saúde coletiva. A análise de processo destacou um forte foco em ações preventivas e de promoção da saúde, embora aplicações de flúor, selantes e cariostáticos tenham sido subutilizados. Restaurações de resina composta em dentes permanentes eram comuns. Emergências odontológicas representaram 17% dos casos, e 95% dos procedimentos cirúrgicos consistiram em extrações e suturas. Além disso, os dentistas realizaram práticas integrativas e outras atividades, como testes rápidos e medições de sinais vitais, particularmente em resposta à pandemia de COVID-19. **Conclusões:** Os achados deste estudo pretendem destacar os pontos fortes e fracos da gestão de serviços visando melhorar os cuidados de saúde bucal no ambiente de atenção primária de Porto Alegre.

Palavras-chave: atenção primária à saúde - gestão de serviços de saúde - saúde bucal; assistência odontológica

INTRODUCTION

Primary care is a fundamental pillar of the Brazilian national healthcare system, providing continuous care based on prevention, health promotion, treatment and rehabilitation¹. Primary care serves as the gateway to Brazil's public healthcare system, as guaranteed by the Federal Constitution. It is the world's only universal healthcare system that provides free care to over 200 million individuals.

Despite the acknowledged importance of oral health for quality of life, Brazil's history in this field has been characterized by limited access and inadequate service provision. In response to the need for improved epidemiological indicators, the National Oral Health Policy was reorganized to expand access and enhance the quality of primary care, aiming to improve the population's oral health status².

Epidemiological data provide the basis for designing studies that involve collecting and analyzing health information. Their primary purpose of such studies is to inform decision-making in health programs and services, guiding the planning and implementation of actions, while enabling the establishment of targets to improve overall performance³. The model proposed by Donabedian et al.⁴ serves as a reference for evaluating the quality of healthcare services through three key components: structure, processes and outcomes. It is assumed that adequate structural conditions facilitate effective processes, which in turn lead to favorable health outcomes³⁻⁵.

The Brazilian Ministry of Health establishes management agreements with state and municipal health departments to guide the evaluation and monitoring of primary care within the public healthcare system. Viana et al.⁶ examined the structure and process components of primary care in 168 municipalities in the state of Pernambuco, reporting higher average indicators of dental appointment records in contexts with better-organized work processes. Mendes et al.⁷ investigated the relationship between dentists' professional profiles and the performance of oral health teams, concluding that continuing education and postgraduate qualifications positively influence the quality of dental services provided to the population. Similarly, Bueno et al.⁸ analyzed the association between clinical productivity and dentists' academic backgrounds, finding that 60% of dentists had additional training and that specialists in public health demonstrated higher productivity

compared to those without a specialization or those specializing in other fields.

Studies evaluating oral health in primary care are limited in Brazil. Assessing practices and programs requires well-organized information systems as a key part of health surveillance. In this context, evaluating oral health interventions in primary care is crucial for strengthening programs and ensuring proper resource allocation to public healthcare services. The aim of this study was therefore to describe the patient profile and assess care quality using structural indicators (dentist profiles) and process indicators (actions and procedures) in primary care units in Porto Alegre, southern Brazil.

MATERIALS AND METHOD

Ethical considerations

This study was approved by the Research Ethics Committee of the Porto Alegre Municipal Health Department (certificate number: 6.105.210). The data are accessible to health administrators in the city of Porto Alegre, state of Rio Grande do Sul, Brazil. Participant confidentiality was ensured throughout the study.

Study design

This was an observational, cross-sectional study with a descriptive component.

Study setting

Porto Alegre, with a population of 1,332,570 residents and a Municipal Human Development Index (MHDI) of 0.8059, faces significant health challenges⁹. According to data from the city's Primary Care Policy, 27% of the population is at high risk of health vulnerability, while 80% of residents are registered at primary care units. The healthcare services are decentralized, organized into 17 health districts based on geographic boundaries¹⁰. As of 2022, the oral health primary care network in Porto Alegre consisted of 247 dentists distributed across 104 primary care units.

Data collection

Data for the patient profile component and the evaluation of process indicators were provided by the Porto Alegre Primary Care Board, with a reference period from January to December 2022. To evaluate structure, data were collected using an electronic

questionnaire created in Qualtrics software, which was distributed to dentists via WhatsApp. The reference period for this data collection was August to October 2022.

Data collected for patient profiles included sex (male or female) and age group, which was subsequently classified. For dentist profiles, data collected included sex (male or female), age (in years), experience in primary care (years), academic background (years since graduation), academic title (*lato sensu and stricto sensu*), and specialty (according to the Federal Council of Dentistry). Clinical oral health procedures included in the list of services offered in primary care in Porto Alegre were grouped into three categories: type of care, active search for patients, and dental actions and procedures¹¹. The data were entered into Microsoft Excel spreadsheets and organized into three modules: patient profile, structure evaluation and process evaluation, following the framework proposed by Donabedian et al.⁴.

Data analysis

Descriptive statistics were performed, including the calculation of absolute and relative frequencies. Data analysis was conducted using Microsoft Excel.

RESULTS

In 2022, a total of 475,325 appointments were provided by public dental services in Porto Alegre. Patient profile showed a predominance of females (62%) and individuals aged 35 to 59 years (38%). Patients in early childhood (0 to 4 years) accounted for only 3% of the cases at primary care units, while older adults (60 years and older) accounted for 17%.

Structure evaluation

In 2022, the profiles of 85 dentists (34%) from 61 primary care units (56%) were assessed through a questionnaire. It was found that 80% were women and 75% were under 40 years of age. Additionally, for 70% of the sample, time since graduation was less than fifteen years, and 78% had less than five years' experience in primary care. Over 60% of the dentists reported having a *lato sensu* specialization, while 18% reported a *stricto sensu* qualification. The most common specialization was public health.

Process evaluation

The following actions and procedures are established

for primary care services¹¹. These practices were categorized into three groups: type of care, active search for patients and dental actions and procedures, integrative practices and complementary medicine.

Type of care

Overall, 71% of appointments were scheduled follow-ups, while 18% were first-time visits. Urgent dental care represented 7%, and 3% involved initial consultations and counseling. The remaining 1% consisted of other care types.

Active Search for Patients

Telehealth within primary care constituted the most prevalent approach, accounting for 36% of the actions, followed by home visits, with 31%. Home care services constituted 24%, and 7% involved active searches.

Dental Actions and Procedures

In Porto Alegre, primary care units conducted a total 422,107 registered dental procedures. Most of these procedures (n = 167,889; 40%) focused on Prevention and Health Promotion. Esthetic and functional rehabilitation corresponded to 21%, followed by Dental Urgency at 15%, Other Practices and Activities at 13%, and Oral Maxillofacial Surgery at 11%. Integrative practices accounted for less than 1%.

Table 1 presents the prevention and health promotion procedures performed in Porto Alegre in 2022. Oral hygiene counseling, prophylaxis, and scaling and root planing comprised more than 90% of all procedures. In contrast, topical fluoride application accounted for only 5%, while the use of pit-and-fissure sealants and cariostatic agents accounted for less than 1%.

Table 2 provides an overview of the esthetic and functional rehabilitation procedures performed in the city. Composite resin restorations on permanent teeth accounted for over 70% of the total procedures. In contrast, glass ionomer cement was the most commonly used restorative material for deciduous teeth. Silver amalgam restorations were infrequent, accounting for less than 1% of all procedures.

Table 3 presents the urgent dental procedures performed in Porto Alegre in 2022. Temporary cavity sealing (51%) and pulp access with intracanal medication (46%) comprised over 95% of the procedures in this category. The remaining 2% included other urgent interventions.

Table 1. Dental actions and procedures for prevention and health promotion performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Prevention and Health Promotion	Male n (%)		Female n (%)		n (%)	
Total	61,968	(37%)	105,921	(63%)	167,889	(100%)
Oral hygiene guidance	31,030	(37%)	51,821	(63%)	82,851	(49%)
Scaling, root planing, and supragingival polishing (per sextant)	14,914	(36%)	26,548	(64%)	41,462	(25%)
Prophylaxis / bacterial plaque removal	5,915	(37%)	10,108	(63%)	16,023	(10%)
Subgingival scaling and root planing (per sextant)	3,707	(38%)	6,149	(62%)	9,856	(6%)
Topical fluoride application (individual per session)	3,293	(38%)	5,331	(62%)	8,624	(5%)
Coronal-root scaling (per sextant)	1,093	(39%)	1,698	(61%)	2,791	(2%)
Prosthesis hygiene guidance	669	(29%)	1,600	(71%)	2,269	(1%)
Others	1,347	(34%)	2,666	(66%)	4,013	(2%)

Table 2. Dental actions and procedures for esthetic and functional rehabilitation performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Esthetic and Functional Rehabilitation	Male n (%)		Female n (%)		n (%)	
Total	33,801	(38%)	54,765	(62%)	88,566	(100%)
Restoration of posterior permanent tooth with composite resin	14,515	(36%)	26,308	(64%)	40,823	(46%)
Restoration of anterior permanent tooth with composite resin	9,044	(40%)	13,486	(60%)	22,530	(25%)
Pulp capping	2,415	(36%)	4,227	(64%)	6,642	(7%)
Atraumatic restorative treatment (ART)	2,269	(41%)	3,313	(59%)	5,582	(6%)
Occlusal adjustment	1,931	(37%)	3,355	(63%)	5,286	(6%)
Restoration of posterior primary tooth with glass ionomer cement	1,923	(48%)	2,078	(52%)	4,001	(5%)
Restoration of posterior primary tooth with composite resin	891	(48%)	954	(52%)	1,845	(2%)
Others	813	(44%)	1,044	(56%)	1,857	(2%)

Table 3. Urgent dental actions and procedures performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Urgency	Male n (%)		Female n (%)		n (%)	
Total	24,469	(38%)	39,287	(62%)	63,756	(100%)
Temporary sealing of dental cavity	12,416	(38%)	20,032	(62%)	32,448	(51%)
Access to dental pulp and medicament (per tooth)	6,009	(40%)	9,084	(60%)	15,093	(24%)
Intracanal medicament with or without biomechanical preparation	5,308	(37%)	8,894	(63%)	14,202	(22%)
Others	736	(37%)	1,277	(63%)	2,013	(3%)

Table 4 presents procedures classified as other practices and activities performed in the city. Approximately 60% of these actions involved non-dental procedures conducted by dentists. The most frequent procedures included the rapid SARS-CoV-2 detection test (39%), temperature and blood pressure measurement (30%), and

collecting samples for laboratory examination (16%), collectively accounting for over 80% of the total. Other practices and activities accounted for less than 1% (Table 4).

Table 5 presents the oral and maxillofacial surgical procedures performed in Porto Alegre in 2022. Approximately 95% involved permanent tooth

Table 4. Other practices and activities performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Other Practices and Activities	Male n (%)		Female n (%)		n (%)	
Total	20,815	(39%)	32,776	(61%)	53,591	(100%)
Rapid test for SARS-CoV-2 detection	8,217	(40%)	12,483	(60%)	20,700	(39%)
Measurement of temperature and blood pressure	6,258	(39%)	9,974	(61%)	16,232	(30%)
Collection of material for laboratory examination	3,254	(38%)	5,316	(62%)	8,570	(16%)
Rapid test for HIV/HBV/Syphilis/Hepatitis C	991	(39%)	1,544	(61%)	2,535	(5%)
Anthropometric evaluation	781	(37%)	1,309	(63%)	2,090	(4%)
Clinical evaluation of smoker	625	(34%)	1,216	(66%)	1,841	(3%)
Intraoral X-ray	513	(41%)	726	(59%)	1,239	(2%)
Others	176	(46%)	208	(54%)	384	(<1%)

Table 5. Oral-maxillofacial surgeries performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Oral and Maxillofacial Surgery	Male n (%)		Female n (%)		n (%)	
Total	19,126	(43%)	25,702	(57%)	44,828	(100%)
Extraction of permanent tooth	10,391	(43%)	13,928	(57%)	24,319	(54%)
Removal of surgical stitches	4,594	(40%)	6,841	(60%)	11,435	(26%)
Extraction of primary tooth	2,309	(48%)	2,490	(52%)	4,799	(11%)
Suture of injury in mouth and skin	931	(42%)	1,262	(58%)	2,193	(5%)
Periapical curettage	251	(45%)	304	(55%)	555	(1%)
Odontosection / radiclectomy / tunneling	278	(58%)	200	(42%)	478	(1%)
Others	372	(35%)	677	(65%)	1,049	(2%)

Table 6. Integrative practices and complementary medicine performed in primary care setting according to sex. Porto Alegre, Rio Grande do Sul, Brazil, 2022

Integrative Practices/Complementary Medicine	Male n (%)		Female n (%)		n (%)	
Total	1,092	(31%)	2,385	(69%)	3,477	(100%)
Aromatherapy session	533	(34%)	1,037	(66%)	1,570	(45%)
Chromotherapy session	422	(36%)	755	(64%)	1,177	(34%)
Auriculotherapy session	20	(7%)	272	(93%)	292	(8%)
Phytotherapeutic treatment	78	(31%)	175	(69%)	253	(7%)
Naturopathic treatment	25	(32%)	52	(68%)	77	(2%)
Hands-on healing session	7	(10%)	63	(90%)	70	(2%)
Other	7	(18%)	31	(82%)	38	(1%)

extractions (54%), suture removal (31%), and deciduous tooth extractions (11%). The remaining 2% comprised other surgical interventions.

Integrative Practices and Complementary Medicine Table 6 presents the integrative practices and complementary medicine procedures performed by dentists in Porto Alegre in 2022. Aromatherapy and chromotherapy sessions comprised over 70% of

these practices, while other integrative approaches accounted for only 1%.

DISCUSSION

The integration of oral health into Brazil's public healthcare system is a relatively recent development, with policies designed to align actions and services with the actual health needs of the population¹².

To enhance health outcomes, various assessment tools have been employed to evaluate structural components and work processes, aiming to improve indicators among system users¹³.

This study identified that most oral healthcare services are provided to women aged 20 to 59 years, while early childhood patients are underrepresented. Similarly, Cassal et al.¹ found that 77% of users in Porto Alegre were women aged 20 to 50 years. Other studies suggest that women frequently assume the role of seeking healthcare for their families^{14, 15}. Despite recommendations for the first dental visit to occur within the first year of life¹⁶, dental appointments for infants remain uncommon, in agreement with previous studies^{17, 18}. A local cohort study associated early dental visits with higher maternal education and socioeconomic status but found no association with the number of professionals or team structure¹⁹.

The profile of primary care dentists in Porto Alegre revealed a predominance of women with specialization in collective health. These findings are supported by D'Avila et al.²⁰, who reported similar characteristics using the PCATool-Brazil, and by national data from the PMAQ, indicating that 57% of surveyed dentists had postgraduate training in collective health⁸. This educational background has a positive impact on team performance and highlights the importance of ongoing training in primary care⁷.

In terms of service organization, most visits were scheduled return appointments, suggesting structured care. A flexible appointment system, as discussed by Mendes et al.⁷, is associated with better team performance. Nonetheless, urgent visits—although comprising only 5%-remain essential for low-income populations, who often seek care only when in pain and tend to access services without prior scheduling¹. Among outreach strategies, telehealth was the most frequently used. Widely adopted during the COVID-19 pandemic, this modality was encouraged by the Rio Grande do Sul state government²¹. Internationally, tele-screening proved effective for emergency triage²² and postoperative follow-up²³. In Brazil, although Resolution 226/2020 initially restricted remote dental care²⁴, exceptions were made for tele-monitoring and tele-counseling, especially in prenatal care²⁵. Since then, “tele-appointments” have been incorporated into primary care routines, supporting active patient engagement^{25, 26}.

An analysis of dental procedures and interventions

revealed strong emphasis on prevention and health promotion. These procedures were frequent, and include for example oral hygiene guidance and supragingival scaling, which are effective in periodontal disease prevention and meet most primary care demands²⁷. However, the use of preventive agents such as sealants, cariostatic agents and fluoride remains limited, despite strong recommendations from Pediatric Dentistry associations^{28, 29}. High demand often leads professionals to prioritize curative and rehabilitative treatments^{28, 29}.

Composite resin was the most used material for restorations in permanent teeth, especially in posterior regions. This preference is probably due to the material's esthetic appeal, conservative technique and reparability^{30, 31}. In contrast, silver amalgam was rarely used, reflecting concerns about its appearance and mercury content^{31, 32}.

Atraumatic Restorative Treatment (ART) is a cost-effective, minimally invasive strategy suitable for both public and private sectors. Its benefits include simplified technique, tissue preservation and behavioral management³³. Given its low utilization, we recommend its inclusion in continuing education initiatives to promote broader adoption in primary care³⁴.

Urgent procedures were mostly driven by pain of pulpal origin from deep cavities, aligning with previous reports¹. In these cases, pulpal access and intracanal medication are crucial to relieve symptoms³². Nevertheless, more than half of surgical procedures involved extractions. Delays in endodontic treatment – up to four years in secondary care in Porto Alegre – contribute to this outcome³⁵, along with limited access to diagnostic tools and materials in primary care³⁶.

Integrative and complementary practices, regulated since 2006³⁷, have gained space in dental care to support anxiety and stress reduction. Techniques such as aromatherapy, chromotherapy and auriculotherapy were reported in this study. While some evidence supports their benefits in conditions such as temporomandibular disorders and bruxism^{38, 39}, there is still a lack of high-quality studies to justify broader public investment.

Lastly, procedures not traditionally associated with dentistry, such as SARS-CoV-2 testing, vital sign measurement, and sample collection, were also reported. These practices emerged during the COVID-19 pandemic, when elective dental care was restricted,

and dentists were repurposed for broader health support roles⁴⁰. Their continued execution reflects the ongoing impact of the pandemic on dental practice.

While the study highlights an organized dental care structure within the public system, the findings show that the services do not fully align with Primary Health Care principles, particularly in terms of relevance, appropriateness and life-course suitability. The underuse of services by young children, the focus on curative rather than preventive care, and the limited evidence-based strategies, such as atraumatic restorative treatment (ART) and fluoride, reveal gaps between service provision and population needs. To improve oral health in the universal healthcare system (*Sistema Único de Saúde*, SUS), actions should target life-course needs and age-specific demands, especially in early childhood.

This study is limited by the reliability of secondary data, which may lead to over- or underestimation of certain indicators. Additionally, the cross-sectional design

precludes causal inferences. However, its strength lies in the regional scope, offering relevant insights into the organization of primary oral health care in a major city in southern Brazil. The findings may inform improvements in service delivery and planning aligned with the principles of primary health care.

CONCLUSIONS

The present study highlighted key aspects of the structure and processes of oral healthcare within primary care settings in Porto Alegre, emphasizing the need for ongoing educational initiatives for healthcare providers. These initiatives should focus on integrating proven, yet underutilized, procedures such as atraumatic restorative treatment and pit-and-fissure sealants. Additionally, there is an urgent need to address early childhood dental care and the use of technologies in primary care as essential components of comprehensive oral health management.

CONFLICT OF INTERESTS

The authors declare no potential conflicts of interest with regards to the study, authorship, and/or publication of this article.

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