







Outpatient dental procedures carried out by Pediatric Dentists within Brazil's public healthcare system

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Abstract: Brazil's public healthcare system (SUS) offers specialized oral health services to Brazilians, but the productivity of specialists, such as Pediatric Dentists, has not been characterized. Therefore, the objective of this study was to characterize the outpatient dental procedures (ODPs) carried out by Pediatric Dentists within the SUS. An epidemiological study with an ecological, longitudinal, retrospective, and quantitative approach was conducted. The ODPs carried out by Pediatric Dentists within the SUS were characterized based on type of procedure, complexity level, and circumstance (urgent or elective). Data were analyzed using a descriptive and analytical

of the COVID-19 pandemic (the 2020-2022 years were not included in out by Pediatric Dentists within the SUS. Clinical procedures were of procedures (all p

From 2008 to 2019, excluding COVID-19 pandemic years, the trend over p

Declaration of Interests:

p

it was possible to conclude that Pediatric Dentists carried out diverse dominant pattern of type and complexity.

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Introduction

Brasil Sorridente) in Brazil was to strengthen specialized/secondary oral health care in Brazil's public health system (*Sistema Único de Saúde*; SUS), considering the creation and regulation of Dental Specialty Centers (DSCs).¹ Despite recognizing the need to improve secondary oral health care within the SUS, the offer of dental care in

Brazilian territory, providing resolutivity for most of the population's oral health demands.

access, and access to oral health services within

after the implementation of *Brasil Sorridente*, the relationship between primary and secondary care still needs to be improved, since unmet demands

to secondary care (specialized dental care), such as DSCs. Indeed, the DSCs are the main oral health service associated with secondary level of dental care within the SUS, whose competence must be associated with the management of more complex demands that go beyond the technological density

a referral and counter-referral system. To this end,

prevention actions (stomatology) and specialized care in periodontics, endodontics, minor oral surgery, and care for people with disabilities.

Among the challenges related to DSCs, users' access to dental specialists/specialties is a relevant problem when considering the resolutivity of secondary care and user satisfaction within the SUS. Although a minimum number of specialties is recommended, the waiting times for appointments, the absence of

the actions carried out by the DSCs may vary in the Brazilian regions. Thus, disparities in the structures and processes of dental care may arise, drawing attention to the oral health assistance offered at this level of care. It is important to consider the

its extent and quality) to achieve comprehensive care (integrality) at all levels of care.

Furthermore, in addition to the context of health care levels in Brazil's public healthcare system, there is evidence of the need to evaluate the specialized dental care for children within the SUS,⁸ as well as the inclusion of Pediatric Dentists in the list of mandatory specialties in the DSCs.⁹ This evidence considered the need to promote actions by Pediatric

Dentists in secondary care, especially in the DSCs, as a way to address and strengthen children's oral

Brazil still faces the high frequency of dental caries in children, especially in socioeconomically vulnerable populations and territories.^{8,9} Although there is a report of specialized dental care for children in DSCs,¹⁰ as far as it was possible to verify, there is no in-depth characterization of the actions carried out by Pediatric Dentists within the SUS.

This characterization may be useful to understand what actions have been carried out by these specialists within the SUS, whether in the DSCs or in other health services, as secondary level of care (specialized dental care for children). Therefore, the objective of this study was to characterize outpatient dental procedures (ODPs) carried out by Pediatric Dentists within Brazil's public healthcare system. In addition to providing a descriptive assessment, three alternative

ODPs procedures carried out by pediatric dentists were

), most were of medium and high complexity, regardless of t13(t)4008w0w.9 (S)1. (C<00#18.7i)1

a population-based analysis was conducted with

location of SUS professionals or users. Thus, there was no need to submit the study for ethical approval,

Variables

The variables were the characteristics of ODPs carried out by Pediatric Dentists within the SUS: type of procedure (health promotion and preventive actions, diagnostic, clinical, surgical, and others), complexity (low, medium, and high), and circumstance (elective, urgent, and others). In addition, based on the annual numbers, the time trend and the incidence ratio of new ODPs carried out by these specialists per year were analyzed. Then, to correct for demographic changes over time in Brazil and establish the ODP's incidence rate per year similar to another study, the annual numbers were standardized to 100,000 residents aged zero to fourteen years to capture the most common age group of pediatric patients in the dental setting, considering previous studies on DSC and university-based pediatric dental services.¹⁶⁻¹⁸ Moreover, in the

(*n* of oral health service, considering all outpatient productivity attributed to specialists in Pediatric Dentistry within the SUS.

Data collection

The procedure for retrieving the datasets of interest was based on recommendations on the use of SIA to assess oral health actions within the SUS,¹⁹ as well as on previous similar approaches. All

by the same researcher. To reach the SIA/SUS, the *health care outpatient productivity*, and *“by service location - from 2008”*. The geographic scope for datasets was *Brazil by region and state*. Within the SIA/SUS system, data on ODPs carried out by Pediatric Dentists were extracted utilizing the

were considered. The year and characteristics of the procedures were adjusted using compatible

circumstance. The estimated annual numbers of Brazilian residents aged zero to fourteen years were collected from the Brazilian Institute of Geography

tool, to normalize the datasets.

Data analysis

were used for standard descriptive and analytical

α ²¹ The time trend was assessed by the Annual Percent Change (APC), following the steps described in Latorre and Cardoso²² and Antunes and Cardoso. Considering the SARS-

with and without the COVID-19 pandemic years (2020, 2021 and 2022; *n* = 12). The comparison of

Wallis and Dwass-Steel-Critchlow-Fligner *post hoc* tests (preliminarily) and Generalized Linear

an overdispersion, a quasi-Poisson distribution was detected, and robust variance adjustment was used.

Log ratio). The variable with the highest incidence in the preliminary assessment was adopted as the reference level in GLM analysis.²¹

Results

Table 1 presents the types of ODPs carried residents between zero and fourteen years old. were carried out. When evaluating time trend, there promotion ODPs over time, while the other types of

the COVID-19 pandemic years, preventive/health promotion ODPs were also stationary over time (p

observed in the first COVID-19 pandemic year (2020). After preliminary comparison of the annual numbers between types of procedures, statistically

Clinical and preventive/health promotion ODPs were the majority and higher than the others

Table 2 presents the complexity of ODPs per 100,000 residents between zero and fourteen years old. Most dental procedures were characterized as low complexity, followed by medium and high. Then, in the preliminary analysis, low complexity ODPs showed the highest annual numbers compared to medium and high complexity ODPs ($p < 0.001$).

and high complexity ODPs over time, while low complexity ODPs were stationary. After removing the COVID-19 pandemic years, there was no significant change from the previous analysis across all ODPs complexities.

of different types and complexities of ODPs. As a

were eligible as a reference for this comparison, considering the preliminary analysis (Table 1 and 2).

higher than the other types of procedures (all $p < 0.001$), including health promotion/prevention actions, which was not observed in the preliminary comparison (Table 1). The incidence rate of low

to medium and high complexity procedures,

Table 1.

Table 2.

Dentists carried out a considerable number of different types of dental procedures over the last

outpatient productivity: oral health actions (topical mouthwashes, supervised tooth brushing, and dental

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exams with epidemiological purposes; in group), topical application of fluorides (individual/per session), restorations, and periodontal procedures (dental prophylaxis and sub- or supragingival scaling

extractions of permanent teeth were recorded. The or permanent teeth.

Most ODPs carried out by Pediatric Dentists to circumstance in the outpatient production reports.

addition, more than 600,000 urgency dental care appointments were reported, which differs from the previously mentioned estimate of urgent ODPs. It is also noteworthy that orthodontic/orthopedic

placement of appliances. Monthly control, adjustment and intervention procedures related to orthodontic

as high complexity).

Discussion

This study characterized outpatient dental procedures carried out by Pediatric Dentists in Brazil's
1 was accepted, since clinical ODPs were more frequent

2 was rejected, since low complexity ODPs were more
could not be properly evaluated because the annual number of ODPs without this information within the SUS was too high. In addition, the COVID-

health promotion/prevention actions carried out by Pediatric Dentists within the SUS.

consider that children's access to oral health services

of oral diseases, often dental caries and periodontal diseases. This explains the most frequent ODPs

than half of the outpatient productivity being

products, restorations, and basic periodontal

periodontal diseases, predominantly clinical, and of low complexity. Although a dominant pattern of ODPs was observed, Pediatric Dentists carried out a variety of procedures in Brazil's public health system, including surgical, restorative, endodontic, periodontal, and orthodontic ones.

In addition, when examining these outcomes, it

referral of children to secondary level (specialized dental care), such as unsuccessfully behavioral management of uncooperative children, a challenge

professionals and services.²⁸ In parallel, a previous

not offer this assistance.²⁹

access to their first dental appointment within the SUS. In addition, the oral health demands of young children are not adequately resolved in

in managing the behavior of children in this age group.⁸ Therefore, in addition to the availability of Pediatric Dentists, efforts to improve dental

at this level of care.²⁹

assigned by SIA/SUS. The major medium complexity
appointment in specialized
care

clinical appointment of health professionals (except physicians) with a higher level in specialized care". It is not possible to delimit

the reason for this type of appointment, as well as other ODPs arising from this appointment may have

delimited by the type of dental procedure, with most being categorized as low complexity, regardless of the clinical issues involved. Moreover, some ODP classifications were changed over time, such as intraoral radiographs (periapical and bitewing), which were of medium complexity until August 2020 and were subsequently categorized as low

the annual numbers of medium complexity ODPs, as an example).

Therefore, when observing the ODPs carried out by Pediatric Dentists within the SUS in the

complexity procedures, it is reasonable to question whether the specialized dental care is meeting

than developing secondary level actions properly. This outcome indicates the need to discuss the interface between primary and secondary levels of dental care in Brazil's public health system. This relationship is not well understood, considering

Moreover, it is necessary to review children's oral health demands, the organization of health care

resources, since disparities in access to oral health services are not uncommon.

addition to the ODPs directly related to dental caries, the others are in accordance with the clinical routine in Pediatric Dentistry, which often involves endodontic treatments, preventive and interceptive orthodontic interventions, and surgical procedures, such as extractions, frenectomies, and ulectomies.

Furthermore, several limitations of the secondary level of care in Brazil's public health system should not be disregarded, since it is not uncommon for DSCs to fail to meet productivity goals or to have the minimum mandatory specialties, which may imply the incorporation of complementary specialties, such as Pediatric Dentistry, although the productivity analyzed here was not restricted

Brazil faces an unequal distribution of dentists, especially in terms of the availability of specialists within the SUS compared to the private oral health services (although the SUS is a reference for most Brazilians).

When addressing the impact of the COVID-19 pandemic on the time trend of ODPs carried out by Pediatric Dentists within the SUS, it was observed that health promotion/preventive actions were stationary

onset. In addition, the lowest annual numbers were observed in 2020 for all types of procedures. This outcome is in accordance with the prioritization of urgent dental procedures and social distancing recommendations, considering that pediatric dental procedures within the SUS were mostly carried out in groups. Moreover, a reduction in specialized dental care provided by Pediatric Dentists during

been demonstrated, corroborating this outcome. Removing the 2020-2022 interval did not affect the time trend of ODPs in relation to complexity, which may be understandable when considering that some procedures categorized as medium and high complexity were feasible in the pandemic context, such as urgent care appointments (including its resulting ODPs) and radiographic exams.

As limitations, it is important to consider that specialized care for children within the SUS may also have been carried out by other specialists (*e.g.*

Dentists), as well as by Pediatric Dentists with other specialties (allowing the performance of ODPs that are not directly associated with Pediatric Dentistry). In addition, under- or misreporting of ODPs, as well as delays in SIA/SUS database feeding with outpatient production reports might have occurred, generating aggregated data in other time intervals (outliers) and affecting the trend estimation over time. At last, it is important to highlight that there were no restrictions regarding location or type of

and all health services and productivity within the SUS, including DSCs, were considered. Future investigations may address the relationship between ODPs carried out by Pediatric Dentists and oral

health demands of children assisted in Brazil's public health system, as well as the impact of this productivity on children's oral health indicators.

Conclusion

Pediatric Dentists carried out diverse types of most of them were clinical and of low complexity, and had constant patterns over time. There was not enough information whether the procedure's

circumstance of being elective or urgent. These landscape of specialized dental care for children within Brazil's public healthcare system.

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