

Access to oral health in early childhood in the city of Porto Alegre, Brazil

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Abstract *The goal was to assess the access and factors connected to dental visits in children up to age five in the city of Porto Alegre, Brazil. The cross-sectional study was conducted in 10 Basic Health Units through a questionnaire and clinical examination on 560 children. Clinical (visible plaque, gingival bleeding and defs), socio-demographic, and visit access variables were assessed. Poisson Regression was used to calculate the Prevalence Ratios (PR), with a 95% confidence interval. Results showed that 68.2% of children had never gone to a dentist. The main reason reported for not visiting a dentist was not feeling the need (48.7%) and difficult access to a health clinic (15.8%). The purpose of going to the dentist was for prevention/revision (55.8%), and the most sought-after places for visits were the private office (43.9%) and health clinic (39.5%). The final multivariate model showed that age of the child (95%CI, PR = 1.03 (1.02-1.05)), household income (PR = 1.05; (1.01-1.08)), and the mother having completed high school (PR = 1.69 (1.15-2.56)) were associated with seeking dental consultation. Thus, it is crucial to recognize the importance of the family setting during the first years of life.*

Key words *Oral health services, Dental care for children, Access to health services*

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Introduction

The concept of Primary Health Care (PHC), standardized in 1978 in Alma Ata, Kazakhstan, was built around the world under various interpretations and titles¹. In Brazil, the Ministry of Health defines PHC as a set of health actions, individually or collectively, located at the first attention level of health systems². Based on the guidelines set by Starfield in 2002³, there is a focus on health promotion, prevention of injuries, diagnosis, treatment, rehabilitation, and health maintenance.

In the PHC context, the Family Health Strategy, now recognized as central to the reorganization of services, started as a program in 1994 and has become a priority strategy in the reorientation of the Unified Health System (*Sistema Único de Saúde* –SUS)⁴. In this sense, the National Basic Care Policy, created in 2006, is intended to guide health efforts from a territorial perspective close to the reality of the population, so that the healthcare model² can actually be qualified.

Among the key attributes of Primary Health Care, in which the Family Health Strategy is inserted, the guarantee of access and effective use of services play a central role. However, the concepts of access and accessibility are often used with little clarity and confusedly. To facilitate the understanding of these terms, access is defined as a “gateway” in the health service, being illustrated by the user’s reception location and the paths traversed by the user within the system⁵. Otherwise, accessibility is seen as a broader concept, corresponding to an intrinsic relationship between service provision and its impact on the population’s capacity to use it⁶.

In this context, the National Oral Health Policy, created in 2004, comes into play in order to guarantee the organization of oral health care within the scope of the SUS, and is in line with the guarantee of access to this service. Concomitantly, this Policy highlights the importance of oral health promotion and prevention in infancy, since this is the ideal age bracket for the establishment of healthy habits, and the importance of focusing on the family should not be forgotten⁷.

It is known that many aspects can determine and influence the health-disease process. Regarding oral child health, dental caries is the main problem to be faced in Brazil, as in the last National Survey children aged five had an average of 2.43 decayed teeth⁸, an index that is greater than that recommended by the World Health Organization (WHO). In this regard, early interventions

and approaches are needed individually and collectively to prevent caries. In the literature, oral health advice is suggested to start within the first six months of eruption of the first deciduous tooth in the infant in order to reduce the risk for tooth decay⁹.

Grasping the factors related to the demand for dental consultation in early childhood becomes necessary, since there are a number of variables that permeate access. In addition, there are few national studies on the use of dental services, the reasons influencing the demand for dental care in the first years of life, and the related factors. Therefore, the objective of the study was to evaluate the access and factors associated to dental consultation in children under age five in the city of Porto Alegre, RS, Brazil.

Methodology

A cross-sectional study carried out in Basic Health Units linked to the Municipal Health Department of Porto Alegre during the 2008 National Multiple Vaccinations Campaign, through the application of a questionnaire and clinical examination.

The 11 sanitary districts of the city of Porto Alegre were subjected to block randomization, in such a way that the sampling observed the population proportionality and the number of health units in each region. The vaccination sites were systematically selected at random, using as a base the number of children vaccinated at each health unit during the previous year’s campaign. Of 12 health units, two were excluded because the local coordinator did not authorize the survey, totaling 10 Primary Care Units.

A consecutive sample of 560 children less than 5 years old having at least one visible tooth present in their mouth was evaluated. Parents were approached while waiting in line for the vaccine and invited to participate in the study, in an alternate sequence, so that every other parent was invited. In case of refusal to participate in the study, the next in line was invited and so on. Those responsible for the children were interviewed by 10 previously trained field evaluators using a structured questionnaire that had been pre-tested in a pilot study with children and mothers in the pediatric outpatient clinic of the Federal University of Rio Grande do Sul Dental School. Afterwards, oral examinations were performed by 13 trained examiners who had been calibrated for caries according to WHO recom-

mentations¹⁰. Calibration was performed via an *in vitro* method using exfoliated and/or extracted deciduous teeth described by Cleaton-Jones et al.¹¹ in two steps, with a weekly interval. Other studies have used this methodology in epidemiological surveys^{12,13}, which has recently been clinically validated for the ICDAS which is a more sensitive diagnostic test than the deft index from the WHO¹⁴. For intra- and inter-examiner reproducibility, Kappa scores ≥ 0.6 were accepted. Examinations were carried out under natural light with the aid of wooden spatulas for removal of possible debris on dental surfaces, gauze was used when necessary.

Collected socio-demographic variables were: I) sex; II) age of child and mother; III) number of children; IV) family structure (nuclear (couple with children), expanded (other arrangements), mother/children); V) family income in Reais; VI) schooling of mother and father; VII) child caregiver during most of the time (mother, father, grandfather / grandmother, siblings, daycare center, neighbor, nanny/caregiver, others). Dental visit access variables were: I) "Has the child visited the dentist?", with a choice of 'yes' or 'no' as an answer- being the study outcome; II) reasons for not seeking (no need, difficulty accessing the clinic, lack of interest, lack of time, child not having teeth, not having been referred/indicated, doctor or other professional has already given advice, others); and reasons for seeking (prevention, revision, caries, trauma, referral by another professional, pain, eruption disorders, others); III) consultation location (health clinic, private practice, others).

Collected clinical variables were: I) visible plaque (upper anterior teeth only); II) spontaneous gingival bleeding (assessed by its presence or absence on the upper anterior teeth); III) deft - index corresponding to the DMFS, but related to the surfaces of the deciduous dentition (not including the teeth lost due to difficulty differentiating them from the natural process of dental exfoliation). Index 0 was assigned for cases in which there was no deciduous tooth surface with a carious lesion and an index greater than or equal to 1 was assigned when one or more deciduous surfaces were decayed.

For data analysis, after entering data twice and checking, two variables were categorized seeking the best form for the model: gross family income was described in minimum wages (415.00 reais) and schooling "up to complete basic school", "up to complete high school" and "undergraduate and graduate studies". The analysis was based

on the Statistical Package for the Social Sciences (SPSS 21.0). Descriptive statistics were performed by calculating absolute and relative frequency. Means were compared by Student's t test and the Mann-Whitney test, in addition to the chi-square test for comparison of proportions. Prevalence ratios (PR) were calculated using the Poisson regression analysis with robust variance. The value for rejection of the null hypothesis was 0.05.

The research was approved by the Municipal Health Department Research Ethics Committee of Porto Alegre, RS.

Results

In this study, 560 children were evaluated. Of these, most were males (51.6%), had a mean age of 32.6 (SD \pm 16.2) months, stayed most of the time with their mother (51.3%) followed by the day care (25.1%). Their mothers (54.5%) and fathers (49.4%) did not complete high school and their family income was on average 3.21 (SD \pm 16.2) minimum wages. As for dental questions, 382 children never went to a dentist (68.2%), 208 had a visible plaque at the time of interview, 96 had caries experience, and 24 had spontaneous gingival bleeding.

The rate of children attending and not attending dental visits associated with socio-demographic and dental variables is shown in Table 1. No statistically significant difference ($p > 0.05$) was found for dental visits regarding sex, number of children, type of family, presence of visible plaque, and gingival bleeding. The mean age of the children attending dental visits was 41.4 months (SD \pm 15.3), higher than the mean age of those not attending (28.6 - SD \pm 14.9), showing a significant difference ($p < 0.001$). Similarly, the age of the mothers who took their children to the visit was 30.0 years (\pm 6.9), higher than those who did not take them (28.3 - SD \pm 7.4; $p = 0.009$). The family income also showed significant differences, with 4.82 (SD \pm 6.8) minimum wages for the families that took their children to the dentist, higher than 2.46 (SD \pm 3.4) minimum wages for those who did not take them. With regard to the schooling of mother and father, the children who went to the dentist were observed to have mothers and fathers with a higher level of education. A statistically significant difference for caries prevalence ($p = 0.001$) was found, and children who never went to the dentist had a higher caries experience (55.2%) than those who attended a consultation (44.8%).

Table 1. How often dental consultations were attended or not associated to socio-demographic and dental variables. Porto Alegre, 2008.

Variables	Did not attend dental consultation	Attended dental consultation	p-value
Sex			
Masculino	199 (69.1%)	89 (30.9%)	0.83*
Feminino	174 (68.2%)	81 (31.8%)	
Age (months)	28.6 (± 14.9)	41.4 (± 15.3)	< 0.001#
Age of mother (years)	28.3 (± 7.4)	30.0 (± 6.9)	0.009#
Number of children	1.9 (± 1.2)	1.7 (± 1.0)	0.223%
Type of family			
Nuclear	212 (67.1%)	104 (32.9%)	0.104*
Expanded	126 (75.4%)	41 (24.6%)	
Mother/children	33 (63.5%)	19 (36.5%)	
Family income (MW)	2.46 (± 3.4)	4.82 (± 6.8)	< 0.001%
Schooling of mother			
Complete basic school	179 (78.2%)	50 (21.8%)	<0.001*
Complete high school	159 (66.5%)	80 (33.5%)	
Undergraduate or graduate studies	42 (51.2%)	40 (48.8%)	
Schooling of father			
Complete basic school	150 (75.4%)	49 (24.6%)	<0.001*
Complete high school	152 (68.2%)	71 (31.8%)	
Undergraduate or graduate studies	35 (47.9%)	38 (52.1%)	
Caregiver			
Mother	214 (74.8%)	72 (25.2%)	0.001*
Daycare center	80 (57.1%)	60 (42.9%)	
Others	88 (68.2%)	41 (31.8%)	
Visible plaque			
No	202 (68.7%)	92 (31.3%)	0.412*
Yes	135 (65.2%)	72 (34.8%)	
Gingival bleeding			
No	288 (68.9%)	130 (31.1%)	0.054*
Yes	12 (50.0%)	12 (50.0%)	
defs			
0	324 (72.0%)	126 (28.0%)	0.001*
1 or higher	58 (55.2%)	47 (44.8%)	

*Chi-square test; Student's t test for independent samples; %Mann-Whitney test; MW: Minimum wages.

Table 2 shows raw and adjusted analyses (by Poisson regression) with prevalence ratios and 95% confidence intervals. The univariate analysis showed that greater age of child and the mother, higher family income and maternal schooling, being most of the time in the daycare center, and defs superior to one were associated with seeking dental consultation. However, in the final multivariate model, only age of child (PR = 1.035; 95% CI 1.022-1.048), family income (PR = 1.045; 95% CI 1.008-1.082) and mother completing high school (PR = 1.689; 95% CI 1.114-2.561) were associated with seeking dental consultation. The

adjusted model showed an acceptable quality, as checked by the Deviance ($p=0.604$) and Omnibus ($p < 0.001$) tests.

The main reason presented by the caregivers for not seeking a dental visit was the lack of perceived need in 48.7% of cases, followed by difficulty in accessing the health center (15.8%). On the other hand, the main reason that led caregivers to take children to the dentist was prevention/revision (55.8%), followed by dental caries (9.8%) and dental trauma (9.2%). Among the places sought for consultations, the private practice had a higher frequency (43.9%), followed

Table 2. Raw and adjusted prevalence ratios (PR) for dental consultation. Porto Alegre, 2008.

Variables	Raw PR (95%CI)	Adjusted PR (95%CI)	p-value (adjusted)*
Age (months)	1.034 (1.024-1.044)	1.035 (1.022-1.048)	< 0.001
Age of mother (years)	1.022 (1.002-1.042)	0.995 (0.969-1.022)	0.705
Family income (MW)	1.045 (1.024-1.066)	1.045 (1.008-1.082)	0.015
Schooling of mother			
Up to complete 8th grade	1	1	-
Up to complete high school	1.533 (1.077-2.183)	1.689 (1.114-2.561)	0.014
Undergraduate to graduate studies	2.234 (1.474-3.386)	1.766 (0.924-3.37)	0.085
Caregiver			
Mother	1	1	-
Daycare center	1.702 (1.209-2.398)	1.036 (0.683-1.571)	0.868
Others	1.262 (0.860-1.853)	1.091 (0.701-1.698)	0.699
Gingival bleeding			
No	1	1	-
Yes	1.608 (0.890-2.904)	1.235 (0.656-2.327)	0.513
defs			
0	1	1	-
1 or higher	1.599 (1.114-2.335)	0.996 (0.665-1.515)	0.985

95% CI: 95% Confidence Interval; PR: Prevalence Ratio; MW: Minimum wages.

*Adjusted for Age of Child, Age and Schooling of Mother, Family Income, Caregiver, Gingival bleeding and defs.

by the health center (39.5%) and the hospital (7.0%) (Table 3).

Discussion

This study intended to evaluate the access to oral health in a southern city in Brazil, seeking to understand what factors are associated with dental consultation in children under age five. The investigation of the relationship between clinical and socio-economic conditions and the access to a dentist in this age group led the survey to take on an original quality for the city of Porto Alegre.

In Brazil, there are few epidemiological studies describing the use of dental services in early childhood. A study in the city of Canela (RS) conducted in the same year, with the same age group as this study during a Vaccination Campaign, observed that the prevalence of children who had already attended some kind of dental consultation was 13.3%¹⁵. In another national study, conducted with preschool children in Pelotas (RS), the prevalence of use of dental services for any reason was 37%¹⁶. The 2008 National Household Sample Survey also showed a similar prevalence: 77.9% of children aged 0 to 4 years had never been to a dentist¹⁷.

On the international scene, the prevalence of dental consultations among preschool children varies according to the country under study. Children up to age 5 had more access to a dentist in the United Kingdom (94%)¹⁸ and Canada (96.9%)¹⁹, while in other developed countries such as Australia²⁰ and Spain²¹, such prevalence was approximately 30%. On the other hand, studies conducted in Mexico²² and China²³, with representative samples, obtained similar results to this study (31.8%). Although this survey demonstrates greater access than at the national level, the prevalence does not suffice yet to ensure universal access to early oral health care. Furthermore, this higher value can be explained by a non-probabilistic sample presented by us.

Regarding the demand for dental consultation, it was possible to perceive that the main reason for going to the dentist was seeking prevention/revision in 55.8% of the children, a result similar to that for the city of Torres (RS) (52.3%)²⁴. Similarly, in Spain, of 1159 children (3 to 6 years old), 80.5% had the checkup as motivation for their consultation²¹. In Melbourne (Australia) most of the parents of 625 immigrant children up to age 4 reported “no reason for dental consultation”²⁵. Even though the literature shows a low prevalence of review as a reason for

Table 3. Reasons for not seeking and for seeking dental consultation. Porto Alegre, 2008.

Reasons for not seeking	n (%)	Reasons for seeking	n (%)
Did not need	129 (48.7%)	Prevention	58 (35.6%)
Difficulty accessing health center	42 (15.8%)	Revision	33 (20.2%)
Lack of interest	32 (12.1%)	Caries	16 (9.8%)
Lack of time	15 (5.7%)	Trauma	15 (9.2%)
Child does not have teeth	9 (3.4%)	Referral by another professional	11 (6.7%)
Was not referred/indicated	7 (2.6%)	Pain	6 (3.7%)
Physician or other professional already gave advice	6 (2.3%)	Eruption disorders	6 (3.7%)
Others	25 (9.4%)	Others	18 (11.1%)
Total	265 (100%)	Total	163 (100%)

consultation²³, several authors argue that access to the dentist in early childhood is aimed at the prevention of diseases and maintenance of oral health^{20,21,26-28}. It can be inferred that the understanding of the parents or guardians of these children is more focused on prevention and health maintenance than on cure.

Few studies have presented the reason for not seeking dental treatment in early childhood. In this survey, the main reason was the lack of need perceived by parents (48.7%), similar to a study conducted in Canada²⁹. In contrast, in Australia, the barriers encountered were treatment costs (40%) and long waiting lists (28%)²⁵. This lack of parents' perception can be explained by the fact that they believe that the affections to the deciduous teeth are not relevant and that the dentist should be sought only in cases in which the child presents severe symptoms³⁰.

With regard to family income, it was possible to observe in a study carried out with 970 children aged 5 to 12 in the city of Recife³¹ (PE) that children who did not have dental consultation were also included in low-income families (55.1% with monthly family income up to one minimum wage). In other Brazilian cities this finding was similarly noted^{15,16,32}. The international literature corroborates these results, since there are several studies in which lower income is positively associated with a lower demand for dentists^{20,21,33-35}, even when access to healthcare in the country is high¹⁸. In this sense, it can be inferred that low income is a factor closely related to the less access to services and may be combined with scarce financial resources or even poor access to information on this population's health.

Massoni *et al.*³¹ noted, in relation to the schooling of parents or guardians, a value close to

this study, in which 42.7% attended high school. Other authors³⁶⁻³⁸ have demonstrated a significant association between dental consultation and the level of mother's education. Although the level of paternal schooling follows a pattern similar to that of maternal schooling, it becomes insignificant in multivariate analyses on the subject^{32,33,39}. In order to control income as a possible confounding factor in the analyses, the higher level of maternal schooling was still associated with the use of health services, both in Brazil^{16,32} and internationally^{21,33,35,40}. This association can be explained due to the lower access to maternal health information, impairing the understanding of the importance of early prevention.

The age of the mother in this study was observed to have a significant association with the demand for dental services. The results showed that children whose mothers were older attended more dental consultations than those with younger mothers. Similarly, it is possible to notice, in another study carried out in cities in Maranhão, whose sample comprised 1214 children aged 0 to 5 years, that the use of oral health services was higher among children whose mothers were over age 35⁴¹. In Pelotas (RS)¹⁶ and Campina Grande (PB)³², children with younger mothers used services less frequently. However, this observation is not yet conclusive in the international literature, since some studies find an association with maternal age^{27,38}, while others do not^{33,42}. Although the results of this study did not show an association between the number of children and attending a dental consultation, it is argued that older women are likely to have more knowledge about child care from previous pregnancies⁴³.

Regarding the relationship between the caries index and dental consultation, coincidental data

are found in the literature. In the study by Darmawikarta et al.⁴⁴, children with carious lesions were found to be less likely to have visited the dentist than to those who had no caries experience. Another study, conducted in Ponta Grossa (PR) with a sample of 123 children aged from 1 to 3 years who attended the Polio Vaccination Campaign, showed that children who had recent dental care had lower prevalence of caries⁴⁵. In this study, no statistically significant association was found in this regard.

This study observed, as in a cohort study carried out with a similar sample³³, that children who had visited the dentist had a higher average age. In other studies in the literature, this is also seen^{15,22,32,38,46}, demonstrating that, as the months of life elapse, the chances of having a dental appointment are greater. This increase can be explained by several factors, from the need perceived by parents as oral problems become more prevalent with increasing age to the fact that parents have more time to learn about the importance of prevention. In addition, it is also possible that, in view of the severity of dental demands over time, there may be an increase in the prevalence of caries so that, following the onset of pain, parents take their children to the dentist.

The literature shows that adult women, in general, seek dental services more often than men. However, these results demonstrate, based on the literature^{47,48}, that there is no sex-related difference in seeking a dentist during early childhood, and

this can be explained on the grounds that in this age group the demand for dental care is dependent on the decision of parents or guardians.

This study presents the limitation of not having a probabilistic sample. In addition, the fact that it was conducted exclusively during one day of the Vaccination Campaign may have generated a more homogenous sample, since those who go to campaigns may also seek more a dentist more frequently. It is likely that other factors related to access may be involved in the low prevalence of demand for dental consultations in early childhood. Thus, longitudinal studies assessing what factors relating to services may be associated, certainly will be useful to delve into this topic. Additionally, the evaluation of the advances made so far in Porto Alegre is believed to be valid as a contribution to the continued qualification of policies, serving to steer oral health efforts in Primary Health Care in the city.

Conclusion

The access to oral health in early childhood in the population under study was low and was associated with socio-economic aspects, age of child, and maternal education, as well as family income. It is necessary to emphasize oral health prevention and promotion among children and the importance of the family setting in this process during the first years of a child's life.

Collaborations

MO Comassetto and KA Kindlein participated in the design and manuscript writing. A Baumgarten participated in the design, data analysis and interpretation, and manuscript writing. JB Hilgert participated in the design and critical review of the manuscript. MC Figueiredo and DD Faustino-Silva participated in the design, writing and critical review of the manuscript.

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