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Urgency and discontinuity of oral health care in children and adolescents

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Abstract *The aim of the present study was to investigate the discontinuity of oral health care among children and adolescents who accessed emergency services at primary care units and urgent care units. Records were reviewed of patients aged 0 to 17 years treated in the public healthcare system in city of Curitiba, Brazil. Discontinuity was considered when elective treatment was not registered at the primary care unit within six months after urgent care. The sample was stratified based on the Municipal Human Development Index (MHDI) (≤0.799 or ≥0.800). The association between discontinuity and covariables was assessed using univariate and multivariate Poisson regression models with robust variance (α=0.05). The incidence of discontinuity was 42.2%. In the MHDI≤0.799 stratum, the risk of discontinuity was greater among children younger than five years of age and individuals who had not had a dental appointment in the previous year. In both MHDI strata, the risk of discontinuity was higher in patients who received urgent care at an urgent care unit than those treated at a primary care unit. The incidence of the discontinuity of oral health care was high and was strongly influenced by the characteristics of dental service utilization among individuals living in regions with a lower MHDI.*

Key words *Continuity of Patient Care, Oral health, Unified Health System, Child, Adolescent*

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Introduction

Health systems organized through primary care have better health indicators and equity in terms of access as well as lower costs[1]. As the first level of care in a health system, primary care actions should be humanized and centered on the individual, addressing the family and directed at the community. Primary care should be characterized by problem solving, integration and the long-term follow-up of individuals and should be the preferred gateway to the healthcare system[2]. These aspects enable the building of a stable, personalized, long-standing relationship between the population and health professionals[3].

In the Brazilian public healthcare system, primary care is structured through a network of primary care units situated near the residences of the population. Primary care units are the regular source of primary care[4] and should be the main point of contact between the public and the healthcare system. In this system, the network of urgent and emergency care is composed of both urgent care units and primary care units[5].

Chronic diseases account for a large portion of the disease burden in Brazil, exerting a significant impact on the public healthcare system[6]. These conditions, which are becoming increasingly prevalent due to the demographic transition, share the same risk factors associated with lifestyle, eating habits, tobacco use, excessive alcohol intake and hygiene patterns. Hypertension, diabetes, cardiovascular disease and even oral problems[7] are examples of chronic conditions with the possibility of acute episodes throughout the course of the disease.

The absence of pain/discomfort of a dental origin is an important oral health outcome[8]. The literature has demonstrated that quality of life[9,10] and the perception of oral health in children and adolescents are strongly impacted by episodes of toothache[8,11], which also exert an impact on parents/guardians in the form of emotional distress and missed days of work[12]. Despite advances in recent years in the field of collective oral health in Brazil[13], toothache still affects a significant portion of children[14] and adolescents[15]. Moreover, studies report that regions with worse human development indices have more reports of toothache among children and adolscents[14,15].

Considering the high prevalence of dental pain and the need to prevent further events, it is important for urgent care teams to be organized in such a way as to enable the continuity of care after the resolution of the urgent oral health need. Indeed, the regular use of oral health services, especially preventive services, has been associated with a lower need for urgent care services[16].

Despite the relevance of this issue and knowledge on factors associated with the use of urgent care dental services, especially at universities and the emergency wards of hospitals[17-19], there is a lack of studies that evaluate the continuity of care in children and adolescents having been treated for urgent dental needs in the public healthcare system.

As the report of pain is mainly due to conditions that can be prevented and treated in primary care, which is the level of health care responsible for the follow-up of individuals, the aim of the present study was to analyze factors associated with the discontinuity of oral health care at primary care units among children and adolescents having received urgent care at either an urgent care unit or primary care unit in the city of Curitiba, Brazil.

A better understanding of these factors could assist public administrators in the organization of an oral health network that establishes ties between children and adolescents treated for dental emergencies and the healthcare system.

Methods

Study design and population

A prospective study was conducted involving all electronic charts of individuals aged 0 to 17 years who accessed public urgent oral care services in the city of Curitiba in April 2014. Treatment was performed at 108 primary care units and three urgent care units. Only individuals with a definitive registry in the electronic system of the Municipal Secretary of Health of Curitiba were included in the study.

Data collection and ethical aspects

The data were collected by a single researcher using the electronic patient chart system denominated *e-health*. This system includes information from the entire oral health network of the primary care and urgent/emergency care network of the Municipal Secretary of Health. Discontinuity of care was considered in the absence of records of elective care at a primary care unit in the six months after urgent care. The following information was collected for each individual having undergone urgent care: sex, age, primary

care unit at which the individual is registered, the occurrence of previous care in the municipal oral healthcare network, type of care during last dental appointment, date of last visit to a dentist and type of service used for urgent care (primary care unit or urgent care unit).

The sample was stratified based on the municipal human development index (MHDI) of the human development unit of the patient's residence. The MHDI is the municipal level of the human development index, which considers income, education and longevity in the population. The index ranges from 0 to 1, with higher values indicating better living conditions. In metropolitan regions, the MHDI is attributed to intra-metropolitan spatial segments that have more homogeneous socioeconomic characteristics, denominated human development units[20]. According to the most recent data from the United Nations Development Programme (UNDP, 2013), the MHDI of human development units in the city of Curitiba ranges from 0.62 to 0.93[20]. The MHDI of the respective human development unit of the residence of each patient having undergone urgent oral health care was obtained from the human development map available at the electronic address http://www.atlasbrasil.org.br/2013/. The address of the primary care unit at which the individual was registered was used for this purpose.

This study received approval from the Human Research Ethics Committee of the Health Sciences Sector of the Federal University of Paraná.

Statistical analysis

The data were tabulated and analyzed with the aid of SPSS® Statistics (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY, USA). The association between the discontinuity of care and other variables was analyzed through univariate and multivariate Poisson regression analyses with robust variance. Relative risk (RR) and respective 95% confidence intervals (CI) were calculated. Variables with a p-value < 0.20 in the univariate analysis were incorporated into the multivariate regression model. The variables "type of last dental appointment" and "visited dentist in previous year" were not included in the model, as these are subgroups of one of the categories of the variable "first access of public health/oral health care". The significance level was set at 5%.

For the statistical analysis, the variables were dichotomized: type of last dental care (elective or urgent), type of service used for urgent dental care (primary care unit or urgent care unit). Age was categorized into three groups (≤ 4 years, 5 to 11 years or ≥ 12 years). The following were also considered: whether or not the urgent care was the first access of the system (determined to define the occurrence of prior care in the municipal oral health network) and whether the child/adolescent had visited a dentist in the public healthcare system of the city in the previous year (yes or no). The outcome variable (discontinuity of care at the primary care unit) was determined by the lack of any record in the electronic chart for a scheduled appointment or initial assessment in a period of six months following the urgent care episode. The study population was stratified based on the MHDI of the human development unit of the residence of the patient and classified based on the United Nations Development Programme as MHDI ≤ 0.799 and ≥ 0.800 (UNDP, 2013).

Results

A total of 1,012 electronic charts were analyzed of children and adolescents up to 17 years of age who received urgent care in the municipal oral healthcare network of the city of Curitiba in April 2014: 908 at primary care units and 104 at urgent care units. A total of 66.8% and 33.2% resided in human development units with MHDI ≤ 0.799 and MHDI ≥ 0.800, respectively (Table 1). Mean age was nine years, five months and 26 days (standard deviation = 4.7).

The incidence of discontinuity was 42.2%, with similar incidences among those who resided in human development units with MHDI ≤ 0.799 and ≥ 0.800 (43.3% and 39.8%, respectively).

Distribution in terms of sex was balanced. Females accounted for 52.6% of the sample (Table 1). No significant association was found between sex and discontinuity in either of the strata (Tables 2 and 3).

In the group with MHDI ≤ 0.799, the risk of discontinuity was greater among those who had not visited a dentist in the public healthcare system of Curitiba in the previous year (RR_c: 1.44; 95% CI: 1.20 to 1.74) (Table 2). Urgent care representing the first access of the public oral healthcare system was associated with discontinuity in the univariate analysis (RR_c: 137; 95% CI: 1.11 to 1.69) (Table 2), but the significance of this association was lost after controlling for other covariables in the multivariate analysis (RR_a:

Table 1. Characteristics of Participants. Curitiba, PR, Brazil, 2014 (N = 1,072).

Variables		Frequency	%
Sex	Male	480	47.4
	Female	532	52.6
Age group	≤ 4 years	174	17.2
	5 to 11 years	516	51.0
	≥ 12 years	322	31.8
1st access of public oral health care	Yes	123	12.2
	No	889	87.8
Type of service	Urgent care	104	10.3
	Primary care	908	89.7
Type of last care**	Urgent	97	10.9
	Elective	792	89.1
Visited dentist in previous year **	No	282	68.3
	Yes	607	31.7
MHDI of human development unit of residence	≥ 0.800	336	33.2
	≤ 0.799	676	66.8

**Considering only those who received dental care in the oral health network of the Municipal Secretary of Health of Curitiba. MHDI = Municipal Human Development Index.

1.22; 95% CI: 0.97 to 1.53) (Table 4). The multivariate model also demonstrated that children in the five-to-eleven-year-old age group had a lower incidence of discontinuity (RR_a: 0.74; 95% CI: 0.58 to 0.92) compared to those aged four years or younger. Moreover, individuals who received urgent care at an urgent care unit had a 34% greater risk of discontinuity than those who received care at a primary care unit (RR_a: 1.34 95% CI: 1.07 to 1.67) (Table 4).

In the group with MHDI ≥ 0.800, the only variable associated with the discontinuity of care was the type of service used, as those treated at an urgent care unit had a 53% greater risk of discontinuity than those treated at a primary care unit (RR: 1.53 95% CI: 1.10 to 2.13) (Table 3).

Discussion

No continuity of care was achieved in a large portion of the children and adolescents who sought urgent dental care in the public healthcare system. Moreover, discontinuity was similar in the two groups stratified based on the MHDI.

Individuals who have used urgent dental services more than once have a greater probability of continuing to use such services as their main source of dental care[17]. Children and adolescents who seek healthcare services due to a toothache and for whom care is discontinued are subject to further episodes of pain and suffering, with impacts on daily activities, such as going to school, eating, playing and sleeping[10,11]. Besides treating and controlling the progression of dental caries, regular oral health follow-up by primary care services could avoid the recurrent demand for dental care due to episodes of pain in this age group.

In the present study, children and adolescents in both MHDI strata who sought care at an urgent dental care service were at greater risk factor of the discontinuity of care compared to those who sought care at a primary care unit.

Several aspects may be related to this finding. One should bear in mind that it may be easier for individuals who reside in areas with MHDI ≥ 0.800 to continue treatment in places other than primary care services, limiting care at an urgent care service to an urgent episode when other services are unavailable.

Although individuals with a lower socioeconomic status seek urgent care services more[21] and encounter more barriers to regular oral health services[22,23], the insufficient interaction between urgent care and primary care services[21] may also contribute to the discontinuity of care in this group. In a recent review addressing barriers and facilitators of the integration of oral health in primary care, the discontinuity of integral care was associated with inadequate references systems and deficient interfaces among different services[24]. The problem could be minimized by strategies that orientate individuals who receive care at an urgent care service to seek continuity at a primary care unit, such as the use of reference and counter-reference guides, the facilitation of scheduling and a clear definition of priorities.

In this study, an association was found between age group and discontinuity only in the group with a lower MHDI. Children less than five years of age with MHDI ≤ 0.799 were less likely to return for regular care after urgent dental care. It has been demonstrated that a large part of children treated at urgent care services do not receive any type of clinical dental procedure to relieve pain; they only receive medications and requests for radiographic exams or are sent to another type of service[19,25]. A low problem-solving capacity can lead to the aggravation of the problem. Delayed treatment makes a problem more complex, which makes the intervention more difficult and less accessible[26]. Another aspect to consider is that the lack of return for continued treatment

Table 2. Univariate poisson regression with robust variance for discontinuity of care in group with MHDI ≤ 0.799. Curitiba, PR, Brazil, 2014 (N = 676).

Variables		Discontinuity of Care					P	RRc	95%IC	
		Yes	%	No	%	Total (100%)				
Age group	≤ 4 years	65	55.6	52	44.4	117		1		
	5 to 11 years	127	38.4	204	61.6	331	0.001	0.69	0.56	0.85
	≥ 12 years	101	44.3	127	55.7	228	0.042	0.80	0.64	0.99
1st access to public oral health care	Yes	46	56.8	35	43.2	81	0.004	1.37	1.11	1.69
	No	348	58.5	247	41.5	595		1		
Type of service	Urgent care	41	56.2	32	43.8	73	0.010	1.34	1.07	1.68
	Primary care	252	41.8	351	58.2	603		1		
Type of last care*	Urgent	36	50.7	35	49.3	71	0.073	1.26	0.98	1.62
	Elective	211	40.3	313	59.7	524		1		
Visited dentist in previous year*	No	101	52.3	92	47.7	193	< 0.001	1.44	1.20	1.74
	Yes	146	36.3	256	63.7	402		1		
Sex	Male	138	42.3	188	57.7	326	0.609	0.96	0.80	1.14
	Female	155	44.3	195	55.7	350		1		

RRc = Crude Relative Risk; CI = confidence interval. Results in bold significant at 5% level. *Considering only those who received dental care in the oral health network of the Municipal Secretary of Health of Curitiba.

Table 3. Univariate poisson regression with robust variance for discontinuity of care in group with MHDI ≥ 0.800. Curitiba, PR, Brazil, 2014 (N = 336).

Variables		Discontinuity of Care					P	RRc	95%IC	
		Yes	%	No	%	Total (100%)				
Age group	≤ 4 years	23	40.4	34	59.6	57		1		
	5 to 11 years	75	40.5	110	59.5	185	0.980	1.01	0.70	1.44
	≥ 12 years	36	38.3	58	61.7	94	0.801	0.95	0.63	1.43
1st access to public oral health care	Yes	20	47.6	22	52.4	42	0.248	1.23	0.87	1.74
	No	114	38.8	180	61.2	294		1		
Type of service	Urgent care	18	58.1	13	41.9	31	0.012	1.53	1.10	2.13
	Primary care	116	38.0	189	62.0	305		1		
Type of last care *	Urgent	7	26.9	19	73.1	26	0.235	0.67	0.35	1.29
	Elective	107	39.9	161	60.1	268		1		
Visited dentist in previous year *	No	33	37.1	56	62.9	89	0.696	0.94	0.68	1.29
	Yes	81	39.5	124	60.5	205		1		
Sex	Male	58	37.7	96	62.3	154	0.447	0.90	0.69	1.18
	Female	76	41.8	106	58.2	182		1		

RRc = Crude Relative Risk; CI = confidence interval. Results in bold significant at 5% level. *Considering only those who received dental care in the oral health network of the Municipal Secretary of Health of Curitiba.

on the part of younger children may be related to the inadequate perception of parents regarding the importance of oral health and the need for regular dental checkups for their children[27].

Although a large part of the population of the city of Curitiba (approximately 60%) resides in regions with an MHDI classified as very high (≥ 0.800) (UNDP), most children and adolescents who sought municipal public dental services for urgent care were from areas of the city with a lower MHDI. This finding may be related to the greater risk of toothache among children and adolescents in regions with a lower HDI[14,16]. Moreover, the demand for public healthcare services

Table 4. Multivariate poisson regression model with robust variance for discontinuity of oral health care among individuals with MHDI ≤ 0.799. Curitiba, PR, Brazil, 2014.

Variables		p	RRa	95%IC
1st access to public oral health care	Yes	0.092	1.22	0.97 - 1.53
	No		1	
Type of service	Urgent care	0.011	1.34	1.07 - 1.67
	Primary care		1	
Age group	≤ 4 years		1	
	5 to 11 years	0.008	0.74	0.58- 0.92
	≥ 12 years	0.118	0.83	0.65 – 1.05

RRa = adjusted relative risk; CI = confidence interval. Results in bold significant at 5% level.

is lower among individuals with higher levels of income and education[28], which are directly related to the value attributed to the MHDI[20]. It is therefore likely that a higher MHDI translates to a lower demand for public healthcare services, including urgent dental care.

The risk of discontinued care was greater among individuals in the group with MHDI ≤ 0.799 who had not visited the dentist in the previous year. A similar result is reported in a previous study involving adult beneficiaries of the Medicaid health program in the United States[18]. As the adherence of children to dental care in the healthcare system is favored when there is a policy among family physicians and pediatricians of referring patients to a dentist,[27] changes in work processes that establish a regular flow between medical/nursing teams and oral health teams could facilitate the continuity of oral health care, especially for those who sought urgent care services and do not undergo regular dental checkups.

The association in the univariate analysis between discontinuity and a lack of ties with the public healthcare system prior to the episode of urgent care among those who resided in areas with a MHDI ≤ 0.799 lost its significance when adjusted by other co-variables. Further studies should be developed to gain a better understanding of the impact of first contact with the public healthcare system when occurring due to an urgent care need. Studies have indicated that children and adolescents from families with a poorer socioeconomic status only seek oral health services when they perceive a problem[22,23] and this is often their first contact with a dental service[17]. Moreover, these groups seek regular oral health services less[23]. The humanized reception emphasized by the Brazilian National Oral Health Policy[29] plays an important role in establishing ties between these individuals and the healthcare system. Moreover, the establishment of ties with the health team depends on its problem-solving capacity during first contact with the service. The Family Health Strategy has made an important impact on health outcomes and has also contributed to strengthening such ties[30].

Like every study involving secondary data, the present investigation has limitations that should be considered. Some aspects related to the outcome, such as the degree of urgency of each case and demographic characteristics of the parents, could not be analyzed due to inconsistencies in the records. Another point to consider is that only public services were evaluated when investigating the follow-up of urgent dental care, thereby precluding a generalization of the findings. Due to ethical aspects, the residential address of the individuals was not used for the determination of the respective human development unit; thus, the primary care service at which the individual was registered was used for this purpose. However, as this study was developed in a large metropolis with a structured public oral health network, where the age group studied often uses public healthcare services, the effects of these limitations on the validity of the results are minimized. Another factor to consider was that the data were not collected in duplicate due to the size of the study population. Finally, the maximum time for elective follow-up care was established as six months in the present study, although the search for regular care may have occurred in a longer period of time.

A large number of children and adolescents discontinued oral health care after receiving urgent care at public health services, especially when an urgent care service was used. Access to oral health services often occurs due to an urgent dental need. The present findings indicate a clear need to broaden measures and actions that stimulate the continuity of oral health care for children and adolescents having undergone urgent treatment. This strategy could favor the establishment of ties between these individuals and primary care teams to ensure integral care with a greater problem-solving capacity.

Collaborations

FAO Pereira, LRS Assunção and FC Fraiz were responsible for the conception and design of the study. FAO Pereira and FC Fraiz participated in the data collection. Data analysis and interpretation were performed by FAO Pereira, LRS Assunção, FM Ferreira and FC Fraiz. All authors contributed in the conceptual framework in writing and interpreting the article, as well as the final version.

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