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ORIGINAL ARTICLE

Analysis of Dental Teleconsulting in the Pediatric Dentistry Field of Telehealth Minas Gerais: A Cross-Sectional Study

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ABSTRACT

Objective: To analyze the profile of the dental teleconsulting in the Pediatric Dentistry field of Telehealth Brazil Networks Program, in Minas Gerais centers, Brazil. **Material and Methods:** Asynchronous dental teleconsulting was evaluated in the Pediatric Dentistry specialty, extracted from secondary databases of the telehealth centers: the Clinical Hospital of the *Universidade Federal de Minas Gerais* and UFMG Medical School, from July 2015 to July 2017. The variables collected were: type of issues and area and sub-area of Pediatric Dentistry. The results were descriptively analyzed using the SPSS v.22,0 program by frequencies. **Results:** Most of the issues in the Pediatric Dentistry specialty were about clinical conduct (81.4%). There was a predominance of issues regarding prevention (16.6%), surgery (15.3%), tooth eruption (15.1%), endodontics (12.1%), harmful oral habits (9.7%), patient cooperation (8.7%), primary teeth trauma (7.2%) and dentistry (6.7%). Regarding sub-areas, most issues were related to child oral hygiene (68.5%), tooth extraction (92%), tooth eruption chronology (65.6%), pulp diagnosis (49.0%), bruxism (64%), patient management (74.3%), post-trauma treatment (79.3%), and restoration (88.9%). **Conclusion:** Pediatric Dentistry teleconsulting suggested a difficulty of the professionals in the pediatric patient approach. Continuing education programs and training courses for professionals working in primary health care are crucial for the comprehensive care of pediatric patients.

Keywords: Primary Health Care; Pediatric Dentistry; Telemedicine; Education, Distance.

Introduction

Brazil has a long history of childhood dental caries disease [1,2]. In 2003, an epidemiological survey found that almost 27% of children aged 18 to 36 months had at least one deciduous tooth with experience of dental caries, with the proportion reaching almost 60% in 5 years old children [1]. In 2010, a new epidemiological survey showed the need for special attention to primary dentition since the experience of caries in children aged five years was, on average, 2.43 teeth. Of these, less than 20% were treated at the time the epidemiological tests were performed. In 2003, this same average was 2.8 affected teeth, which shows a reduction of only 13.9% in 7 years [2].

Currently, one-fifth of Primary Health Care Units (PHC) in Brazil still does not offer dental care for children in early childhood [3]. As a result, a significant number of children have never been to the dentist. The main reasons are that the children's guardians do not consider dental treatment necessary or the difficult access to a health clinic [4]. Besides the difficulties of access of the child population to dental treatment in Brazil, Minas Gerais (MG) state still has the most significant number of municipalities in the country (n=853) and has great demographic, geographic, and socioeconomic contrasts that reinforce the challenge of offering health equally [5].

In 2007, the National Telehealth program was created to reach the remote population. In October 2011, it was redefined and expanded and called the Telehealth Brazil Networks Program [6,7]. The program promoted the exchange of information between health professionals and specialists, valid for the diagnosis, prevention, and treatment of diseases [8]. Teleconsulting can be performed out in two ways: synchronous or asynchronous. In real-time (online), the first is carried out through dialogues between PHC professionals and specialists. The second occurs through messages at different times (offline), which must be answered within 72 hours by the centers' specialists [9]. The need for referral to specialized care can be avoided through teleconsulting by reducing unnecessary referrals. The service improves PHC resolvability, reduces costs, contributes to the improvement, and reduces professional isolation [5,9]. Currently, there is no specialized dental care for children in Brazil, as Pediatric Dentistry is not part of the list of procedures offered by the Dental Specialties Centers (DSCs) [10]. However, specialized child care is necessary to provide higher complexity care for the demands arising from PHC [11], and without it, it is difficult to achieve the comprehensive treatment of the child population in the Unified Health System.

A previous analysis of the dental teleconsulting of the National Telehealth Brazil Networks Program in Minas Gerais showed that Pediatric Dentistry was the third area with the highest prevalence of issues [12]. Therefore, in the face of children's oral health conditions and lack of specialized dental care for the pediatric population in Brazil, this study aimed to evaluate the teleconsulting questions in the pediatric dentistry area sent to MG Telehealth centers. The study hypothesis was that the highest prevalence of issues in the pediatric dentistry area was related to the clinical conducts of the pediatric patient.

Material and Methods

Ethical Clearance

This study was approved by the Research Ethics Committee of the *Universidade Federal de Minas Gerais* (CAAE 67446817.2.0000.5149).

Study Design

This quantitative cross-sectional study used secondary databases of the Telehealth centers in MG from July 2015 to July 2017. One of the centers is located at the UFMG Clinical Hospital (CH-UFMG) and covers 91% of the state's municipalities. The other one is located at the UFMG Medical School (MS-UFMG) and covers the other municipalities in the states and the intermunicipal centers of Belo Horizonte, Brumadinho, and Contagem [12,13].

Data Collection

This study focused on asynchronous dental teleconsulting in the Pediatric Dentistry specialty. The variables collected were type of issue in teleconsulting (diagnosis or clinical conduct – treatment, prevention, or monitoring) and the area and sub-area of Pediatric Dentistry. Each teleconsulting was read and categorized by two investigators (VAC and LCP) to determine the type of question, area, and sub-area. Divergent cases were discussed with a third investigator (RCM), responsible for establishing the team until the final classification. Duplicated teleconsulting, extracted without questions and containing incomplete information or were not classifiable within Dentistry were excluded.

Data Analysis

The data were analyzed descriptively using IBM SPSS Software, version 22.0 (IBM Corp., Armonk, NY, USA), using absolute and relative frequency.

Results

A total of 4,093 teleconsulting were carried out in MG in the analyzed period. After the exclusion criteria, the final sample was of 3,920 teleconsulting, of which 84.8% (n=3,324) were from the CH/UFMG center and 15.2% (n=596) from MS/UFMG [12]. Pediatric Dentistry was the third area with the highest prevalence of concerns (10.3%), only preceded by Pathology/Stomatology (19.0%) and Pharmacology/Anesthesiology (18.8%) areas [12].

The four fields with the most concerns in Pediatric Dentistry were prevention (16.6%), followed by surgery (15.3%), tooth eruption (15.1%), and endodontics (12.1%). Most teleconsulting was related to clinical conduct (81.4%) (Table 1). Table 2 shows the types of issues within each area and sub-area of Pediatric Dentistry.

Table 1. Descriptive analysis of pediatric dentistry teleconsulting according to the type and area.

Area	Diagnosis N (%)	Clinical Conduct N (%)	Total N (%)
Prevention	11 (2.7)	56 (13.9)	67 (16.6)
Surgery	8 (2.0)	54 (13.4)	62 (15.3)
Tooth Eruption	34 (8.4)	27 (6.7)	61 (15.1)
Endodontics of Primary Teeth	3 (0.7)	46 (11.4)	49 (12.1)
Harmful Oral Habits	5 (1.2)	34 (8.4)	39 (9.7)
Patient Cooperation	0 (0.0)	35 (8.7)	35 (8.7)
Primary Teeth Trauma	3 (0.7)	26 (6.4)	29 (7.2)
Dentistry	3 (0.7)	24 (5.9)	27 (6.7)
More than One Area*	2 (0.5)	19 (4.7)	21 (5.2)
Semiology	6 (1.5)	8 (2.0)	14 (3.5)
Total	75 (18.5)	329 (81.4)	404 (100.0)

*Surgery and Endodontics (28.6%), Dentistry and Endodontics (23.8%), Surgery and Orthodontics (19%), Pharmacology and Surgery (9.5%), Dentistry and Surgery (4.8%), Tooth eruption and Surgery (4.8%), Cooperation and Pharmacology (4.8%), Orthodontics and Endodontics (4.8%).

Table 2. Descriptive analysis of the Pediatric teleconsulting according to area and sub-area.

Pediatric Area	Sub-Area	N (%)
Prevention	Child Oral Hygiene	46 (68.5)
	Sealants/Cariostatic	5 (7.5)
	Caries	4 (6.0)
	Breastfeeding	4 (6.0)
	Frequency/Need for Consultation	3 (4.5)
	Fluorosis/Acute Intoxication	3 (4.5)
	Halitosis	2 (3.0)
Surgery	Tooth Extraction	57 (92)
	Cleft Lip	3 (4.8)
	Anesthesia	1 (1.6)
	Facial Trauma	1 (1.6)
Tooth Eruption	Eruption Chronology	40 (65.6)
	Symptoms	8 (13.1)
	Intervention/Gingivectomy	6 (9.8)
	Early Loss of Primary Tooth	4 (6.6)
	Pharmacology/Symptom Relief	3 (4.9)
Endodontics of Primary Teeth	Pulp Diagnosis	24 (49.0)
	Intracanal Medication	7 (14.3)
	Filling	7 (14.3)
	Abscesses	6 (12.2)
	Pulpotomy	4 (8.2)
	Oral Medication	1 (2.0)
Harmful Oral Habits	Bruxism	25 (64)
	Pacifier Sucking/Finger Sucking	12 (30.8)
	Biting/Sucking Lip	1 (2.6)
	Not Specified	1 (2.6)
Patient Cooperation	Uncooperative Patient Management	26 (74.3)
	Anxiolytics/Sedation	9 (25.7)
Primary Teeth Trauma	Post-Trauma Treatment	23 (79.3)
	Replantation	4 (13.8)
	Splinting	2 (6.9)
Dentistry	Restoration	24 (88.9)
	Surgery Crown Lengthening	1 (3.7)
	Prosthesis	1 (3.7)
	Pulp Capping	1 (3.7)
More Than One Area	Surgery and Endodontics	6 (28.5)
	Dentistry and Endodontics	5 (23.8)
	Surgery and Orthodontics	4 (19)
	Pharmacology and Surgery	2 (9.5)
	Dentistry and Surgery	1 (4.8)
	Tooth Eruption and Surgery	1 (4.8)
	Cooperation and Pharmacology	1 (4.8)
	Orthodontics and Endodontics	1 (4.8)
Semiology	Brain Impairment	6 (43)
	Blood Disorders	2 (14.4)
	Excessive Salivation Management	1 (7.1)
	Dental Impairment in Premature Babies	1 (7.1)
	Mumps	1 (7.1)
	Systemic Alterations	1 (7.1)
	Blood, Oral, and Weight Impairment	1 (7.1)
	Growth and Function Alterations	1 (7.1)

Discussion

There was a greater prevalence of issues on how to conduct early childhood children's treatment. This can be explained because there is a large proportion of preschoolers who have never been to the dentist [4]. In this way, PHC dentists are more accustomed to treating adults, making the reality of the children far from

their clinical practice [14]. Although the proportion of caries-free individuals has increased in Brazil [2], dental caries is still among the most prevalent chronic diseases worldwide and a severe public health problem [15]. Therefore, Pediatric Dentistry care is essential to reduce the incidence of childhood caries and prevent its occurrence in the future.

Most issues analyzed were related to prevention. These requested basic conducts such as oral hygiene of the child and most questioned about the ideal amount of fluoride in the toothpaste for each age group. For example, a study that assessed dentists' knowledge regarding the oral health care of preschool-age children found that 69% of them indicated the use of fluoride-free toothpaste for children under three years old [16]. This data confirms the misinformation of PHC professionals concerning infant patient care since toothpaste with fluoride concentration lower than 1,000 ppm is not an effective method for preventing caries [17]. Although preventive procedures are the most performed in Brazilian PHC [18,19], concerns about prevention aimed at child care reinforce the lack of knowledge of these professionals about the pediatric clinic. Another factor that may have been responsible for the high percentage of issues in prevention and tooth eruption areas is that other professionals, such as doctors, nurses, and community health workers, also request the support of the teleconsulting program to clarify Dentistry issues. Faced with symptoms of tooth eruption, mothers first turn to the pediatric doctor, followed by dentists, pharmacists, and nurses [20].

Due to the significant coronary destruction caused by caries disease, a toothache is still the leading cause of urgent infant visits, making extraction of primary teeth the most performed procedure in PHC [21]. However, surgery was the second-most requested in teleconsulting, despite the frequent contact of PHC professionals with this type of procedure [18,19]. Surgical issues, such as the best time to extract a deciduous tooth, or the need to perform a suture or not after this procedure, highlight, once again, the scarce contact of these professionals with pediatric patients on a daily clinical routine.

The eruption chronology was the most prevalent among tooth eruption issues. One explanation is the lack of studies that elucidate the causes of eruption chronology of primary teeth alterations [22]. Also, the multifactorial profile of this alteration can make planning a challenge for the dentist [23], along with the low attendance of preschool children in health services, as previously discussed [14]. Therefore, the professional should seek specialists' opinions and self-inform about the subject, essentially about the mixed dentition phase, given its importance for planning and treating cases [24].

The prevalence of issues about endodontics of primary teeth was relatively high. Many dentists have difficulties diagnosing and planning cases requiring endodontic treatment, such as choosing the ideal root canal shaping technique and the most suitable material for both intracanal medication and filling [25,26]. The data found in this study reaffirm this reality since issues related to intracanal medication and root canal system (RCS) filling were prevalent. This may also be linked to the lack of a clinical protocol for pulp treatment of deciduous and a consensus on the ideal filling material added to the lack of knowledge about these issues [25,27]. This situation requires these professionals to be updated frequently on the indication and execution of procedures in endodontics [28]. Another factor contributing to the high prevalence of issues in the endodontics area is that endodontic treatment of primary teeth is not included in the PHC procedures. This procedure is part of endodontics DSCs [10]. Moreover, most Oral Health Teams do not have access to a DSC [29]. Consequently, the referral of complex PHC cases to secondary care is compromised, making PHC the only public health service option for children. Thus, professionals who do not have regular contact with this type of treatment use Telehealth as an auxiliary tool for clinical decisions [30].

Regarding harmful oral habits, there was a higher prevalence of issues about bruxism, which can be justified by the multifactorial nature of the disease, making its diagnosis challenging [31]. Furthermore, the lack of interaction between pediatric dentistry specialists, orthodontics, speech therapy, pediatrics, and psychology significantly compromises the successful prevention and treatment of some harmful oral childhood habits [32]. This reality hinders the resolution of cases in PHC, in which the population is limited to primary procedures and does not receive complete treatment.

Patient cooperation was also a demanded area in teleconsulting issues. Considering that the treatment of infant patients requires technical knowledge about child development and professional skills, the child's cooperation becomes the main factor for making dental treatment possible [33]. Also, many children are afraid of dental treatment as they believe they will experience some type of discomfort and, therefore, exhibit more difficult handling behavior. Such information corroborates the high prevalence of issues about the management of uncooperative patients [34]. Issues in this area can contribute to more referrals to secondary care in cases where this is possible [29]. It should be noted that Pediatric Dentistry is not always covered by the DSC [10]. Therefore, the psychological approach of children should be prioritized and studied by the PHC professionals, as it is an essential step in the dental treatment of children and can define a good relationship with the dentist [35].

Although childhood dental trauma cases are common and have some complex treatment, there was a lower prevalence of issues about this subject [36]. This may have occurred because children who suffer dental trauma, especially those of low intensity, do not reach PHC, as those responsible do not always know that the trauma occurred or do not give it due importance [14,36].

The low prevalence of issues about dentistry can be justified by the more frequent contact of professionals with this area since restorative procedures are among the most performed in PHC [18,19]. Amorim et al. [21] state that restorative treatment is one of the most performed in the emergency treatment of pediatric patients. Also, the procedures performed may require low-complexity procedures, which results in a lower rate of visits to specialists.

Semiology teleconsulting also occurred in a smaller percentage vis-à-vis the total and most were related to the cerebral impairment children care. The care for patients with special needs is fundamentally multi-professional. Thus, the fact that professionals use teleconsulting as a complementary tool in planning these children's treatment may favor comprehensive actions and continuing education [37]. The Ministry of Health states that most patients with special needs have demands met within PHC, as long as the locations are adapted and the teams trained. However, DSCs and hospitals are references for specialized treatment of patients with severe impairment [37].

The PHC dentists must be, in fact, generalists and look to Pediatric Dentistry as a general clinic so that they can meet most of the needs of the child population. Moreover, the use of Telehealth is essential, as this program has contributed to professional training, increased PHC effectiveness, and improved the oral health services provided [38]. Therefore, Teledentistry is a vital support tool for PHC professionals. However, care must be taken so that professionals do not settle for receiving a "prompt answer". According to the National Curriculum Guidelines and Laws of Dentistry, professionals must learn continuously during graduation and clinical practice [39]. Distance Education (DE) is another tool that can improve professionals and their skills. According to Bavaresco et al. [40], through Distance Education, it would be possible to significantly improve the quality of care provided to children in public health care networks.

The use of secondary data is a limitation of this study. However, it generated knowledge on the significant issues and challenges faced by PHC professionals in treating infant patients, contributing to strategies designed to improve these professionals' constant learning.

Conclusion

Teleconsulting in the Pediatric Dentistry specialty pointed to difficulties of these professionals in approaching pediatric patients. Therefore, it is vital to offer a continuing education program and training courses for professionals working in PHC to improve pediatric patients' comprehensive care.

Authors' Contributions

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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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