

Endodontic teleconsulting by Telehealth in Minas Gerais state, Brazil

Teleconsultorias endodônticas do Telessaúde no estado de Minas Gerais, Brasil

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Abstract

Background: The Telehealth Brazil Program aims to improve the quality of Primary Health Care. **Objective:** This cross-sectional study evaluated the Telehealth Brazil Networks Program's dental teleconsulting in Minas Gerais state to elucidate the prevalent questions in endodontics. **Method:** Secondary databases of offline dental teleconsulting from the Clinical Hospital and Medical School of the Universidade Federal de Minas Gerais from July 2015 to July 2017 were used. The variables analyzed were telehealth center, dental specialty and sub-area, and question type. The results were descriptively analyzed using the SPSS v.22.0 program. **Results:** A total of 3,920 teleconsulting sessions were carried out. Endodontics was the field with the sixth-highest demand for questions (7.4%). The most prevalent endodontic questions were related to pulpal and periapical alterations (32.3%), being more related to diagnosis, followed by dental trauma (15.6%), endodontic emergencies (11.4%), and intracanal medication (7.3%), all of them with most questions related to clinical conduct. **Conclusion:** The endodontic field questions were related to prevalent conditions in the daily activities of the primary health care professionals. It is crucial to continuously update the professionals through continuing education programs and the search for new knowledge to reinforce these competencies.

Keywords: telemedicine; distance education; primary health care; endodontics.

Resumo

Introdução: O Programa de Telessaúde tem o objetivo de aprimorar a qualidade da Atenção Primária em Saúde. **Objetivo:** Este estudo transversal avaliou as teleconsultorias odontológicas do Programa Telessaúde Brasil Redes em Minas Gerais para elucidar as dúvidas prevalentes em endodontia. **Método:** Bancos de dados das teleconsultorias *offline* de odontologia do Hospital das Clínicas e Faculdade de Medicina da Universidade Federal de Minas Gerais de Julho de 2015 a Julho de 2017 foram utilizados. As variáveis analisadas foram: núcleo de telessaúde, especialidade odontológica e subárea, e tipo de dúvida. **Resultados:** Os resultados foram analisados descritivamente utilizando o programa SPSS v.22.0. Um total de 3920 teleconsultorias foi realizada. A Endodontia foi a área com a sexta maior demanda por dúvidas (7,4%). As dúvidas endodônticas mais prevalentes foram relacionadas às alterações pulpares e perirradiculares (32,3%), sendo mais relacionadas ao diagnóstico, seguidas por trauma

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dentário (15,6%), emergências endodônticas (11,4%) e medicação intracanal (7,3%), sendo a maioria das dúvidas relacionadas à conduta clínica. **Conclusão:** As dúvidas na área endodôntica foram relacionadas a condições prevalentes nas atividades diárias dos profissionais da atenção primária a saúde. É crucial a atualização constante dos profissionais, por programas de educação continuada e pela busca por novos conhecimentos, reforçando essas competências.

Palavras-chave: telemedicina; educação à distância; atenção primária à saúde; endodontia.

INTRODUCTION

The use of Information and Communication Technologies has become increasingly present in the health field. These tools have been directly applied in the care of patients and through research and distance learning¹. Faster and better-documented care of patients in remote locations was facilitated by the simultaneous, multiple communication between professionals since specialized software and digital imaging diagnostic services have become available².

“Telehealth” reflects this new reality. Through Information and Communication Technologies, telehealth allows for distant care of patients in several health areas³ and supports the continuing education of professionals in the area^{3,4}. Within telehealth, teledentistry, which is related to oral health³, has shown growth of its applications, together with telemedicine, and aims to promote access to quality care that transcends geographical barriers^{3,4}. Also, teledentistry was considered a valid and feasible diagnostic tool comparable to traditional tests, such as presential visual tests^{5,6}.

In Brazil, experience with distance learning and care was adopted as a national policy⁷ via the Ministry of Health initiative in 2006. The “Telehealth” project was implemented^{8,9} to increase people’s access to specialized health services and improve resolution of Primary Health Care (PHC). Since its inception as the National Telehealth Program in 2007, this project has undergone redefinitions and extensions¹⁰ and has been later renamed “National Telehealth Program Brazil Networks”⁹.

The National Telehealth Program Brazil Networks aims to provide assistance or educational support to professionals working in PHC. This support is provided through teleconsulting, a registered consultation between health professionals, through bidirectional telecommunication instruments, to clarify clinical procedures, health actions, and issues related to the work process¹¹. Teleconsulting is performed by real-time messaging or videoconferences (synchronously) or offline messages (asynchronously)^{7,9} in the telehealth centers. In Brazil, remote direct care to patients is not allowed⁷. However, because of the declaration by the World Health Organization (WHO), which classified the disease caused by the new coronavirus (COVID-19) as a pandemic, the Federal Council of Dentistry (FCD) published Resolution nº 226 which allows remote monitoring of patients undergoing treatment by dentists and a pre-clinical questionnaire to define the best time to attend them, within telehealth¹².

In Brazil, dentistry is among the areas of greater demand by the public network professionals using this tool⁷. The Telehealth Program’s support to PHC professionals has been reported in several studies, showing an increase in the utility of these services¹ given the determination of diagnoses in a shorter period⁸ and the avoidance of unnecessary referral of patients to other levels of care⁹.

Most of the country’s population still presents difficulties accessing dental services and disease prevention measures¹³ despite these improvements, making emergency care a constant demand in PHC¹⁴. The main complaint reported by patients seeking PHC is dental pain^{13,14} related to pulp alterations in most of the diagnoses performed¹⁴. Also, endodontics was the field with the highest demand for referral of patients in PHC¹⁵, resulting in a long waiting time for treatment, thus overloading PHC with recurrent urgent services¹⁶.

The demand for questions from PHC professionals through asynchronous teleconsulting in endodontics has not been explored thoroughly. Thus, this study aimed to evaluate the dental teleconsulting of the National Telehealth Program Brazil Networks in Minas Gerais state, emphasizing endodontics and further elucidating the most prevalent questions in this field. Considering the constant complaint of dental pain in PHC emergency care and the high

demand for endodontic procedures in this service, this study hypothesizes that endodontics presents a high demand for clarifications in teleconsulting.

METHOD

This is a cross-sectional and exploratory study, nested in a broader study that used secondary databases of the National Telehealth Program Brazil Networks in Minas Gerais state from July 2015 to July 2017 (25 months)¹⁷. The state of Minas Gerais has two telehealth centers: one center in the Clinical Hospital of the Universidade Federal de Minas Gerais (CH-UFGM), which is responsible for the coverage of 91% of the state's municipalities¹⁷, and another at the UFGM Medical School (MS-UFGM), which covers the rest of the municipalities of the state. As the data collection occurred in 2018, the period of analysis was set due to a significant loss of data from the telehealth centers of Minas Gerais and to collect information from them simultaneously.

The secondary databases of the dental offline teleconsulting were used, extracting the following variables: telehealth center, dentistry specialty area, sub-area of the dentistry area, and type of teleconsultation question, including diagnosis, clinical conduct (treatment, monitoring or prevention), or service operation (questions about the functioning of health services)¹⁷. Each teleconsulting session was read and categorized by two researchers to determine the dentistry specialty area, sub-area of the dentistry area, and type of teleconsultation question. Any disagreement would lead to a discussion to reach the final classification between them and a third researcher responsible for team training.

The procedures for selecting the final sample, including the exclusion criteria, are shown in Figure 1.

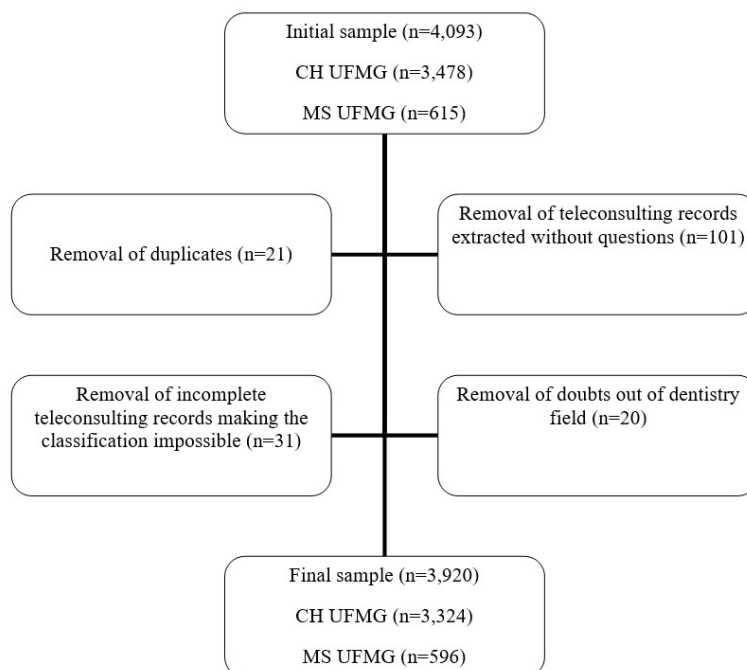


Figure 1. Flow chart representative of the exclusion criteria to obtain the final sample

Statistical Package for Social Sciences – SPSS version 22.0 (IBM SPSS Statistics for Windows, Armonk, NY) was used to analyze the data by frequency descriptively.

The Research Ethics Committees of the UFMG approved the study under protocol no. 2.059.173 (CAAE 67446817.2.0000.5149). Participant consent was not required since secondary data were collected. Access to data from each telehealth center was obtained from people responsible for the custody of these databases. Patients, professionals, and teleconsulting officers were not identified.

RESULTS

During the data collection period, 3,920 teleconsulting were analysed. Of these teleconsulting sessions, 84.8% referred to CH database and 15.2% to that of MS¹⁷.

The highest prevalence of questions among PHC professionals was related to “clinical conduct” (72.1%). When analyzing the areas of dental specialties that comprise the teleconsulting system, endodontics had the sixth highest prevalence of questions (7.4%), preceded by stomatology (19.0%), pharmacology (18.8%), pediatric dentistry (10.3%), surgery (10.2%) and dentistry/prosthesis (8.6%). The fields of dental questions and their respective frequencies can be seen in Table 1.

Table 1. Descriptive analysis of dental teleconsulting sessions according to specialty and type of question in Minas Gerais, Brazil, 2017

<i>Specialty</i>	<i>Type of question</i>			<i>Total n (%)</i>
	<i>Diagnosis n (%)</i>	<i>Clinical conduct n (%)</i>	<i>Service Operation n (%)</i>	
Stomatology	469 (63.0)	276 (37.0)	0 (0.0)	745 (19.0)
Pharmacology	66 (9.0)	672 (91.0)	0 (0.0)	738 (18.8)
Pediatric Dentistry	75 (18.5)	329 (81.5)	0 (0.0)	404 (10.3)
Surgery	41 (10.3)	358 (89.7)	0 (0.0)	399 (10.2)
Dentistry/Prosthesis	51 (15.2)	285 (84.8)	0 (0.0)	336 (8.6)
Endodontics	100 (34.6)	189 (65.4)	0 (0.0)	289 (7.4)
Semiology	46 (16.6)	231 (83.4)	0 (0.0)	277 (7.1)
Periodontics	68 (29.3)	164 (70.7)	0 (0.0)	232 (5.9)
Occlusion/Orthodontics	38 (25.3)	112 (74.7)	0 (0.0)	150 (3.8)
Community Health	21 (20.0)	84 (80.0)	0 (0.0)	105 (2.6)
Others ^a	1 (1.0)	10 (10.0)	90 (100.0)	101 (2.6)
More than one specialty ^b	14 (18.0)	64 (82.0)	0 (0.0)	78 (2.0)
Biosafety	0 (0.0)	46 (100.0)	0 (0.0)	46 (1.2)
Radiology	13 (65.0)	7 (35.0)	0 (0.0)	20 (0.5)
Total	1,003 (25.6)	2,827 (72.1)	90 (2.3)	3,920 (100.0)

^aDental issues that did not fit into specialties, and were related to the health system, health services operation, or the professional field and the job market; ^bDoubts that included more than one dentistry specialty

Specifically, in endodontics, there was a higher frequency of teleconsulting sessions related to pulp and periapical alterations (32.3%), most of which were related to the diagnosis of these alterations, followed by dental trauma (15.6%), endodontic emergencies (11.4%), and intracanal medication (7.3%), with a higher prevalence of questions about clinical conduct. The frequencies of questions related to the endodontic field concerning the type of questions presented by professionals of PHC can be observed in Table 2.

Table 2. Descriptive analysis of dental teleconsulting sessions according to endodontic sub-area and type of question in Minas Gerais, Brazil, 2017

<i>Endodontic sub-area</i>	<i>Type of question</i>		
	Diagnosis n (%)	Clinical conduct n (%)	Total n (%)
Pulp and periapical alterations	52 (52.5)	41 (21.7)	93 (32.3)
Dental trauma	7 (7.1)	38 (20.1)	45 (15.6)
Endodontic emergencies ^a	8 (8.1)	25 (13.2)	33 (11.4)
Intracanal medication	1 (1.0)	20 (10.6)	21 (7.3)
Retreatment	13 (13.1)	7 (3.7)	20 (7.0)
Mechanical-chemical preparation	2 (2.0)	16 (8.5)	18 (6.3)
Medication prescription	1 (1.0)	13 (6.9)	14 (4.9)
Other ^b	15 (15.1)	29 (15.3)	44 (15.2)
Total	99 (100.0)	189 (100.0)	288 (100.0)

^aAbscess and canal drainage, dissemination of infections, edema, flare-up, pulpotomy, pulpectomy, pain relief; ^bRoot resorption (3.8%); Financial conditions (3.5%); Complications: perforations, file fracture, hypochlorite extravasation, tooth browning or weakening after endodontic treatment (3.1%); Apicification (1.7%); More than one category (1.4%); Root canal system filling (1.0%), paraendodontic surgery (0.7%)

DISCUSSION

It was observed that endodontics was not the specialty with the most significant demand for teleconsulting in Minas Gerais. However, most questions in this dental field were related to the procedures performed daily in the PHC. Thus, the study results do not support the hypothesis that endodontics would have high clarification demand in teleconsulting sessions.

The type of treatment to be performed and the monitoring and prevention of clinical alterations were the more prevalent questions among PHC professionals related to “clinical conduct”. These questions highlight a limitation that may be related to these professionals’ technical ability or the structure of services, such as a lack of equipment and input, which may hinder professional decisions for the identified problems.

This study evidenced that endodontics, the dental field that most frequently addresses issues related to odontogenic pain^{13,14}, was not the specialty with the most significant demand for teleconsulting by users, and was the sixth-highest demand. This observation may be due to the high demand for urgent endodontic care involving pain in the daily PHC routine¹³⁻¹⁵, which would lead most PHC professionals to be more familiar with the conditions of the patients.

To the best of our knowledge, this is the first study describing the endodontic issues demanded on the asynchronous teleconsulting of a Telehealth Program, and therefore, are new and unexplored findings that may help to understand the profile of difficulties faced by PHC professionals.

The most prevalent questions in the field of endodontics were related to the dentists’ daily practice in PHC. They included questions about the diagnosis of pulp and periapical alterations, dental trauma, endodontic emergencies, and intracanal medication. The patients with endodontic impairment require an adequate diagnosis of the present alterations and immediate treatment of the emergencies due to their impact on the quality of life, such as pain and functional and aesthetic alterations^{18,19}. Therefore, pain relief¹³ and correct use of intracanal medication²⁰ are required.

The pulp and periapical alterations included questions about pulpitis, pericementitis, pulp necrosis, pulp exposure, sensitivity tests, and the need for endodontic treatment and its feasibility. Most of the questions were associated with diagnosis. The first phase of endodontic

treatment should always correspond to diagnosis, which is the most critical step in treatment planning. This step should be performed with a combination of information on several aspects about the patient to reach the correct conclusion and, consequently, an adequate treatment of his/her current condition²¹. Thus, the patients' treatment/referral may be compromised if professionals struggle in establishing a correct diagnosis for pulp and periradicular alterations.

The second highest prevalence of questions in endodontics was related to dental trauma, mainly regarding traumatic lesion care. Dental trauma is a public health problem globally²² since it has a high prevalence and causes significant psychosocial impact, pain, and stress in patients¹⁹. It impacts the quality of life and generates high treatment costs as it involves different dental specialties²³. Therefore, the determination of an adequate treatment within a short period is crucial as it will allow a better prognosis for these cases²². It is necessary to promote information about the first steps following traumatic lesions to improve prognosis, especially after avulsions¹⁹.

Insufficient knowledge of dentists regarding the treatment of traumatized permanent teeth²⁴, and a low level of knowledge regarding the emergency procedures to be performed in cases of dental avulsions and their reimplantation, have been observed. Thus, educational campaigns focusing on the subject and efforts to promote the prevention of lesions are required¹⁹.

Questions related to endodontic emergencies were also among the most prevalent in endodontics, mostly including questions about pain relief and procedures for pulpotomy, pulpectomy, drainage of abscesses, and questions about the spread of infections, edema, and flare-ups. Literature has reported that dental pain is the main complaint by patients seeking emergency care service^{13,14} and most of the diagnoses are related to pulp alterations¹⁴. Access to the pulp chamber is the most frequently performed clinical procedure for these emergencies in PHC¹³. Dental emergencies are conditions that adversely affect an individual's life, such as reduced concentration, decreased productivity, sleep hours loss, increased occupational accident risk, and even absenteeism¹⁸. PHC should be staffed with professionals prepared to address endodontic emergencies for pain relief to patients searching for this type of treatment.

Questions related to intracanal medication referred to the choice of medications according to the pulp and periapical alterations and their properties. The use of intracanal medication is one of the stages of the treatment of endodontic emergencies and is also very present in PHC professionals' daily lives; thus, the medication should be selected according to physical and chemical properties²⁰.

The endodontic field questions with a lower demand were generally related to aspects that were more specific to the care performed by specialists in secondary care. These questions referred to steps of treatment that PHC professionals should know to properly attend to the patients, such as questions about conduct concerning endodontic treatment, canal exploration, use of the irrigating solution, and whether or not to leave the pulp chamber open after intervention in PHC. Also, there were questions about the diagnosis of endodontic retreatment, in which treatment is not performed in PHC. However, the decision between endodontic re-intervention and follow-up of the case is of significant importance since it determines the patient's referral or maintenance in the PHC unit, respectively. Thus, an efficient referral and counter-referral system is crucial in this context. If endodontic patients are not treated by specialists, they will return to the PHC emergency service and overload it¹⁶. Unfortunately, it has been reported that endodontics is one of the dentistry fields with the most extended waiting times after a PHC referral^{15,16}.

Questions in endodontics were preceded by questions in stomatology, pharmacology, pediatric dentistry, surgery, and dentistry/prosthesis. A possible explanation could be a deficient academic training in basic areas^{25,26} of these professionals, possibly due to educational distancing from clinical practice. This problem would lead to the professionals' fragmented learning, thereby hindering an integrated vision of patients' health and needs in their daily practice. In general, this is observed in all dentistry fields, although mostly in stomatology, pharmacology, pediatric dentistry, and dentistry/prosthesis, thereby resulting in diagnosis and treatment questions by the PHC professionals.

Despite the low prevalence, we observed questions that included more than one dental field. When analyzing the types of teleconsulting questions, an earlier study observed that the same question is expected to require more than one issue to be clarified concerning the same clinical case, which illustrates the role of teleconsulting in providing a real discussion of clinical cases²⁷.

This study's limitations refer to the fact that the dental offline teleconsulting records were obtained from secondary databases of the National Telehealth Program Brazil Networks, hindering the collection of complete data in some cases, resulting in the loss of some information. However, this is the first study that analyzed endodontic teleconsulting.

The most frequent questions observed in the endodontic specialty point to a technical limitation of the professionals, hampering their decision-making. Thus, professionals' education should be continuously refreshed through continuing education programs and search for new knowledge, thus strengthening these competencies to improve the quality of care. Moreover, it is crucial to remediate deficiencies and fill in the gaps left by a fragmented education.

Although endodontics associated with a great demand for PHC, it was not the specialty with the most significant user teleconsulting demand. It was the sixth-highest request after stomatology, pharmacology, pediatric dentistry, surgery, and dentistry/prosthesis. In general, most of the endodontics questions referred to the clinical conduct of treatments and the very prevalent conditions or procedures in PHC. Professional continuing education is of utmost importance to improve care quality, remediate shortcomings, and fill in the gaps left by a fragmented education.

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