

Oral Medicine and Pharmacology Teleconsulting Sessions of the Telehealth Program in one Southeastern State of Brazil

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ABSTRACT

Objective: To evaluate questions concerning oral medicine- and pharmacology-related specialties of asynchronous dental teleconsulting sessions of the Telehealth Brazil Networks Program. **Material and Methods:** Data were collected from secondary databases of asynchronous dental teleconsulting sessions of the telehealth centers of Minas Gerais from July 2015 to July 2017. The variables for dental underlying fields and the types of questions were evaluated. Descriptive analysis was performed with the SPSS v.22.0 program. **Results:** 3,920 teleconsulting sessions were referred to the telehealth centers of Minas Gerais during the study period. Regarding oral medicine-related questions (n=745), most (n=469; 62.95%) addressed diagnosis, whereas the underlying field questions mostly regarded fungal, viral, and bacterial infections (17.3%), biopsies (16.4%), developmental defects and dental abnormalities (9.9%), and soft tissue tumors (9.4%). Pharmacology-related questions (n=738) mostly addressed general approaches (n=672; 91.06%), and the most common questions were about underlying fields' prescriptions (44.7%), anesthetics (17.6%), adverse effects of medications and anesthetics (10.2%), and selection of anesthetics for patients with systemic conditions (9.8%). **Conclusion:** Most teleconsulting sessions regarded conditions or procedures common in primary health care and essential for diagnosis and treatment planning at all care levels, which suggests a need for more academic learning processes for healthcare professionals, especially in dentistry primary fields.

Keywords: Education, Distance; Oral Medicine; Pharmacology; Primary Health Care; Telemedicine.

Introduction

Telehealth refers to applying information and communication technologies in health [1,2]. It has been used to increase the availability of continuing education for health professionals and support multidisciplinary patient care and access to services [2]. Moreover, it has promoted substantial quality, efficiency, and cost improvements [3,4]. Similarly, teledentistry has become a valid and feasible means of diagnosis, comparable to traditional tests, and is being used worldwide [5,6].

The Brazilian telehealth project was implemented in 2006 [3,4], following an initiative of the Ministry of Health [7]. Since its establishment, the program has been expanded and redefined to strengthen and increase primary health care (PHC) services and access to specialized care [3,4,8]. The project is currently called the Telehealth Brazil Networks Program [4].

One of the program's strategies is to support PHC professionals through teleconsulting services, which consist of conversations between the professional and a consultant (an expert in a specific field) seeking assistance or knowledgeable information on a clinical issue. Telehealth centers offer teleconsulting sessions and can be held by exchanging asynchronous messages, which must be answered within 72 hours, or synchronous messages conveyed by online messaging or videoconferencing [4]. According to Brazilian regulations, teleconsulting sessions are allowed only among professionals and cannot be held directly between patients and health professionals [2]. However, the COVID-19 pandemic has called for specific changes, including the adoption of a resolution promulgated by the Federal Council of Dentistry (FCD), which allowed the remote monitoring of patients undergoing treatment by dentists by filling out a pre-clinical questionnaire to define the best time to tend these patients [9].

Telehealth has improved the efficacy of healthcare services [1], mainly by providing a faster diagnosis [3], which improves the patient's prognosis and prevents unnecessary and indiscriminate referrals to other care levels [4]. Dentists are expected to handle the challenges posed by daily practice satisfactorily, including properly assessing the patient's condition, making a diagnosis, and planning treatment. They should also focus on health promotion and applying scientific and clinical knowledge to issues arising in their routine practice [10].

The telehealth program was evaluated to ascertain its operations and benefits to patients. A previous analysis of the asynchronous dental teleconsulting services of the Telehealth Brazil Networks Program in Minas Gerais showed that the highest number of questions addressed two primary fields of dentistry: oral medicine and pharmacology (19% and 18.8%, respectively, corresponding to a total of 38.7%) [11]. High demand for oral medicine-related requests was also observed in southern Brazil, where the Federal University of Rio Grande do Sul (UFRGS) created a specific telediagnosis service (EstomatoNet) [12]. Diagnosing and managing oral lesions were the main topics broached by the synchronous teleconsulting services offered by the Technical and Scientific Center for Telehealth of the Federal University of Rio Grande do Sul (TelessaúdeTS-UFRGS) [13]. These topics are vital for overall diagnosis and treatment planning at all care levels and are often the core queries of professionals [14]. Accordingly, this study aimed to describe the asynchronous teleconsulting services for the oral medicine and pharmacology specialties of the Telehealth Brazil Networks Program in Minas Gerais. This study hypothesized that oral medicine-related questions primarily concern identifying and diagnosing lesions, whereas pharmacology-related questions would cover general approaches.

Material and Methods

Ethical Clearance and Study Design

The Research Ethics Committee of the Federal University of Minas Gerais (UFMG) approved the study under CAAE 17400319.9.0000.5149. The database administrators provided access to the telehealth center data. This cross-sectional and exploratory study is nested in a previous analysis of asynchronous dental teleconsulting sessions [11]. Both were based on secondary databases of two years (July 2015 to July 2017) obtained from two Telehealth Brazil Networks Program centers of Minas Gerais: the UFMG Clinical Hospital (CH-UFGM), with coverage of 91% of the state's municipalities and the UFMG Medical School (MS-UFGM), which extends out to include the remaining municipalities of the state and intermunicipal centers of Brumadinho, Belo Horizonte, and Contagem [11]. The flowchart sequencing the asynchronous teleconsulting service distribution process in Minas Gerais is shown in greater detail in Figure 1.

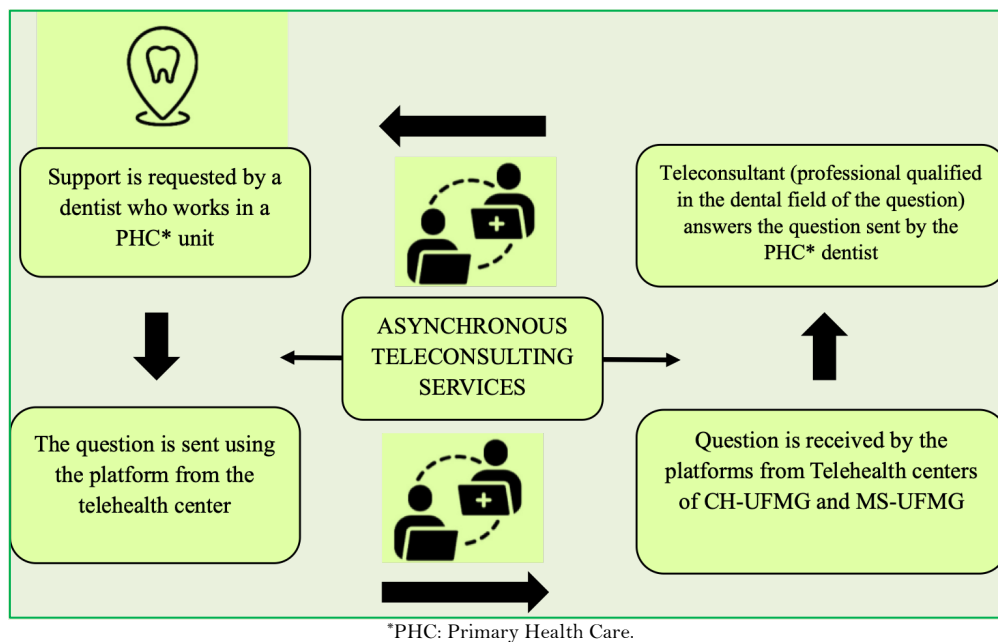


Figure 1. Flowchart of the ordering of the teleconsulting distribution process in Minas Gerais.

Data Collection

The procedures of each teleconsulting session were read and categorized by two researchers (LCP and VAC) to determine the dental specialty, the underlying dental field, and the type of teleconsulting question. Any disagreement would be resolved by a third researcher (RCM) responsible for team training, establishing the final classification after discussions. Data from asynchronous dental teleconsulting regarding oral medicine- and pharmacology-related specialties were collected, including the underlying variables of the dental field and the type of teleconsulting question. The information related to the latter was classified as either diagnosis or general approach (treatment, monitoring, or prevention), and the oral medicine and pharmacology underlying field specialties were categorized based on the available literature [15,16].

Although some of the teleconsulting sessions may have had clinical images sent by the PHC professionals to supplement the information on the questions, these images were not accessed by the present study since the study data were extracted only from the questions.

Data Analysis

The descriptive analysis was performed using the Statistical Package for Social Sciences – SPSS version 22.0 (IBM SPSS Statistics for Windows, Armonk, NY, USA).

Results

The proceedings of 3,920 teleconsulting sessions were sent to Minas Gerais Telehealth centers during the study period. As mentioned in the previous literature, the oral medicine and pharmacology specialties received the highest number of questions: 745 (19.0%) and 738 (18.8%), respectively, corresponding to a total of 1,438 (38.7%) questions [11].

Most oral medicine-related questions of the present study addressed underlying fields concerning fungal, viral, and bacterial infections (17.3%) (mostly related to general approaches), followed by biopsies (16.4%), developmental defects of the oral and maxillofacial region and dental abnormalities (9.9%), and soft tissue tumors (9.4%). Most questions by the professionals (62.9%) were related to diagnosing oral medicine-related conditions (Table 1).

Table 1. Descriptive analysis of teleconsulting questions in the oral medicine field.

Underlying Field of Oral Medicine	Type of Question		Total N (%)
	Diagnostic N (%)	General Approaches N (%)	
Fungal, Viral, and Bacterial Infections	45 (9.6)	84 (30.4)	129 (17.3)
Biopsies	90 (19.2)	32 (11.6)	122 (16.4)
Developmental Defects / Dental Abnormalities	64 (13.6)	10 (3.6)	74 (9.9)
Soft Tissue Tumors	41 (8.7)	29 (10.5)	70 (9.4)
Allergic and Immune Diseases	21 (4.5)	35 (12.7)	56 (7.5)
Epithelial Pathologies	36 (7.7)	14 (5.1)	50 (6.7)
Salivary Gland Alterations	31 (6.6)	19 (6.9)	50 (6.7)
Physical and Chemical Injuries	22 (4.7)	15 (5.4)	37 (5.0)
Undefined*	28 (6.0)	9 (3.3)	37 (5.0)
Oral Manifestations of Systemic Diseases	23 (4.9)	4 (1.5)	27 (3.6)
Dermatological Diseases	16 (3.4)	10 (3.6)	26 (3.5)
Other†	52 (11.1)	15 (5.4)	67 (9.0)
Total	469 (100.0)	276 (100.0)	745 (100.0)

*Pathological conditions that the requesting professional did not describe well enough to classify them; †Facial and neuromuscular diseases (2.6%), odontogenic cysts and tumors (2.3%), diagnosis of different lesions (1.1%), pulp and periapical diseases (1.1%), bone pathologies (0.8%), more than one question (0.8%), and myiasis and melanin pigmentation (0.4%).

Pharmacological questions mainly discussed general approaches (91.1%), including underlying field medication prescriptions (44.7%), selection and dosage of anesthetics (17.6%), adverse effects of medications and anesthetics, contraindications and interactions (10.2%), and selection of anesthetics for patients with systemic conditions (9.8%) (Table 2).

Table 2. Descriptive analysis of teleconsulting questions in pharmacology area.

Underlying Field of Pharmacology	Type of Question		Total N (%)
	Diagnostic N (%)	General Approaches N (%)	
Prescriptions	5 (7.6)	325 (48.4)	330 (44.7)
Anesthetics*	16 (24.2)	114 (17.0)	130 (17.6)
Adverse effects, contraindications, and interactions of medications and anesthetics	36 (54.6)	39 (5.8)	75 (10.2)
Choice of anesthetics for patients with systemic conditions	0 (0.0)	72 (10.7)	72 (9.8)
Other†	9 (13.6)	122 (18.1)	131 (17.7)
Total	66 (100.0)	672 (100.0)	738 (100.0)

*Anesthetics for pregnant women, infants, children, and allergic patients: selection, dosage, use of vasoconstrictors, and innervation considerations; †Efficacy and anesthesia techniques (6.8%), more than one question (5.4%), suspending medication before surgery (4.5%), action and metabolism of medications (1.1%).

Discussion

In this study, most questions addressing the oral medicine specialty were related to diagnosis, which raises concern that the treatment will probably only be performed adequately if the pathological alterations are identified correctly. Many oral medicine-related questions were also observed in the EstomatoNet program, in which most of the questions (96.9%) were asked by professionals who felt unfit to diagnose or treat patients with pathological alterations [12]. In contrast, most questions asked in pharmacology discussed general approaches concerning treating, monitoring, or preventing dental conditions, which points to limitations in the scope of knowledge [14] and technical skills of these professionals or a need for adequate structure (equipment and inputs) in their workplace, and this may affect their decision-making capabilities [14]. Thus, the study hypothesis was confirmed.

As for oral medicine, we observed a high prevalence of teleconsulting sessions about general approaches to the underlying fields concerning fungal, viral, and bacterial infections, mainly herpes simplex virus infections and candidiasis. These high-prevalence conditions in the population are frequently seen in the PHC centers [14,17] and affect the patient's quality of life, which underscores the importance of PHC professionals' having in-depth knowledge of the most common oral pathologies so that they can provide patients with an adequate assessment and management of these conditions [14,18].

The second most frequently asked questions regarding oral medicine addressed the underlying fields concerning biopsies, including whether or not a biopsy would be needed and the treatment options for lesions observed by a professional during an oral examination, albeit no description was given of the lesion characteristics. The easy access to the oral cavity for examination facilitates the early detection of potentially malignant and malignant oral lesions [19]. Nevertheless, the many questions regarding biopsies and treatment options for lesions brought into evidence a severe problem: the need for knowledge of those asking the questions. An early diagnosis can only be made if the diagnosis or treatment option is known, and the professional must resort to referring patients at later stages of the condition. These factors are detrimental to achieving a favorable prognosis for oral pathologies, especially oral cancer [20], and can increase the cost of treatment [21].

The difficulty in performing biopsies was also reported in a similar study, in which several teleconsulting sessions discussed nodules and papules that are usually benign but require a total biopsy to define the diagnosis [12]. Most dentists feel unprepared to diagnose and treat these conditions because of inadequate training addressing biopsies and histopathological diagnoses in dental school courses [20]. Moreover, procedures for the early detection of oral cancer are infrequent in PHC; this is an indicator of the need for greater training of professionals and students to enable the detection and biopsy of pre-malignant and malignant lesions and for greater knowledge of the related risk factors [19-21]. In this context, teledentistry may represent an important tool to improve access to care-related oral pathologies [12,13] and enhance the effectiveness of the referral and counter-referral system so that only more complex cases will be referred to secondary care [13,21].

Developmental defects of the oral and maxillofacial region, such as cleft lip and palate and fissured tongue, and dental abnormalities, such as pigmentation and agenesis, were other frequent underlying fields addressed in the teleconsulting sessions in oral medicine. These conditions can affect individual functions and aesthetics. Although usually not treated by the PHC service, they must be recognized and adequately referred to a specialized service to provide those affected with a better quality of life. For example, cleft lip and cleft palate are among Brazil's most common developmental defects, with an estimated prevalence of 260,000 cases. The use of tele-education as an approach to address this condition has already been reported by the "Young Doctor Project," which aims to disseminate information on the topic and encourage the health and social inclusion of affected individuals [22].

Another frequent underlying field observed in the teleconsulting sessions involved soft tissue tumors, especially fibrous hyperplasia (frequently related to poorly adapted prostheses). According to the national oral health survey (SBBrazil 2010), the prevalence of edentulism or the use of removable prostheses is high among adults and older adults [23]. Moreover, there is a high prevalence of patients using inadequate dental prostheses, which act as predisposing factors to trauma and constant mucosa inflammation, resulting in oral lesions such as candidiasis and inflammatory fibrous hyperplasia [24]. These issues involve both oral medicine and prosthodontics, and thorough knowledge of these fields is essential to ensure the correct treatment and prevention of related conditions.

Regarding pharmacology, the most common teleconsulting requests were about general approaches related to procedures frequently experienced in the daily practice of PHC dentists, such as prescriptions, anesthetic choices, and dosages, adverse effects caused by medications and anesthetics, their contraindications and possible interactions, and about the underlying field of anesthetics for patients with systemic conditions.

The lack of knowledge in this field can compromise the effectiveness of treatments and have adverse consequences on patient health. Unfortunately, medication errors prescribed by dentists [14,25] and dental students are common and reveal a lack of knowledge regarding drug dosage and completing prescriptions [26]. The unnecessary or inadequate prescription of antibiotics is one example that can severely affect patient care and microbial resistance, which represents a significant public health problem [14,26].

Thorough knowledge of possible drug interactions is also imperative for a safe and effective drug prescription, especially in an era with a rapidly growing pharmaceutical industry and current polypharmacy practices [27]. Dental professionals should be knowledgeable of the interactions that are pertinent to dentistry. The use of electronic information sources to learn about drug interactions has been common among professionals [27]. However, many dentists struggle to identify potentially harmful drug interactions [27] correctly.

Clinicians should learn more about using local anesthetics (including concentrations and dosages) and drug interactions to reduce adverse effects. Furthermore, dentists should systematically obtain patients' complete medical history and evaluate the factors that may contribute to adverse effects [28]. Clinical drug guidelines should be made more readily available, and greater emphasis should be placed on pharmacology during the training of students in dental schools [26].

A significant number of teleconsulting sessions were about issues related to the conduct of patients with systemic conditions. Many questions were about the oral manifestations of systemic diseases in oral medicine (3.7%) and about selecting anesthetics for these patients in pharmacology (9.8%). These findings indicate a greater need for more knowledge regarding treating patients with systemic conditions.

Educational institutions are responsible for synchronizing professional training with the challenges faced by dentists in the clinic. Therefore, the curricular content of dental schools should be constantly evaluated to better prepare and train dental students for high-quality patient care [9]. Engaging students in situations that demand critical thinking involving multiple specialties will prepare them to adapt to diverse clinical settings in the future and handle the challenges of daily practice [29]. The current educational regulations and laws state that dentists should be able to offer all care levels. Such levels are supported by scientific knowledge, technical skills, and decision-making that ensure effective and appropriate healthcare practices [30]. On the other hand, professionals should engage in reflective practice and continued learning [10,14].

The deficiencies in the academic training process suggested by the results of this study raise a concern and point to the constant need for continued education and periodic updating, whether in person or by distance learning. The Telehealth Program is a fundamental tool to support PHC professionals, considering that it







provides continuing education and professional empowerment in the learning process [13,31]. In the context of the COVID-19 pandemic, teledentistry initiatives have been further explored to provide needed support [14]. However, PHC professionals must reflect on learning how to learn. They should constantly seek updated knowledge rather than accommodating themselves to accepting the readily available answers provided by teleconsultants.

The use of data from secondary databases of the Telehealth Brazil Networks Program was a limitation of this study since some cases needed to allow complete data collection. However, the study provided important information addressing challenges and issues in oral medicine and pharmacology specialties, considered primary fields of extreme importance in the daily practice of PHC professionals.

Conclusion

The professionals who requested teleconsulting sessions struggled to identify and diagnose pathological lesions and prescribe drugs, which suggests a need for more academic learning processes for professionals in fundamental dentistry fields. Continuing education should be encouraged to reinforce and update the knowledge of PHC professionals and improve diagnostic skills and early decision-making processes.

Authors' Contributions

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GPG		https://orcid.org/0000-0002-7648-0683	Writing - Review and Editing.
EFF		https://orcid.org/0000-0002-0665-211X	Writing - Review and Editing.
APRS		https://orcid.org/0000-0002-3598-7592	Conceptualization, Methodology and Writing - Review and Editing.
RCM		https://orcid.org/0000-0002-8911-0040	Conceptualization, Methodology, Formal Analysis, Data Curation, Writing - Review and Editing, Supervision and Project Administration.

All authors declare that they contributed to a 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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