

Telefonaudiologia: ciência e tecnologia em saúde*****

Telehealth in Speech-Language Pathology and Hearing: science and technology

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*****Trabalho Realizado no Departamento de Fonoaudiologia da Faculdade de Odontologia de Bauru da Universidade de São Paulo.

Artigo de Revisão de Literatura e Revisão Sistemática

Artigo Submetido a Avaliação por Pares

Conflito de Interesse: não

Recebido em 25.04.2008.
Revisado em 23.06.2008; 30.04.2009.
Aceito para Publicação em 30.04.2009.

Referenciar este material como:

 Spinardi ACP, Blasca WQ, Wen CL, Maximino LP. Telehealth in Speech-Language Pathology and Hearing: science and technology (original title: Telefonaudiologia: ciência e tecnologia em saúde). Pró-Fono Revista de Atualização Científica. 2009 jul-set;21(3):249-54.

Abstract

Background: distance learning (DL) is becoming a higher education modality with a meaningful impact. It offers students flexibility, mobility and choices. Also it can reach a greater number of professionals and students in a more effective way, when compared to other learning modalities, without losing quality. Brazil needs to develop direct actions to DL in the fields of Speech-Language Pathology and Hearing, due to its great continental territory (8,514,215.3Km²) and irregular distribution of professionals who work in these specific fields (i.e. this situation emphasizes the differences in quality and availability of services offered throughout the country). Heterogeneity in the quality and availability of services is also aggravated by the absence of a national strategy for continued education in order to recycle health professionals. This situation causes important differences in the knowledge and abilities of specialists from one region to the next. **Aim:** to present Telehealth studies in the field of Speech-Language Pathology and Hearing that were developed in the last five years. **Conclusion:** the analyzed data indicate that more studies are needed in this specific field. These studies should aim at improving the quality and access to services which in turn would improve prevention, diagnosis and treatment of communication disorders.

Key Words: Telemedicine; Telehealth; Distance Education; Speech-Language Pathology.

Resumo

Tema: a educação à distância (EaD) tem se tornado uma modalidade de impacto significativa no ensino superior, oferecendo aos estudantes flexibilidade, mobilidade e escolha. É uma ferramenta de grande importância, uma vez que pode atender grandes contingentes de alunos e profissionais de forma mais efetiva que outras modalidades de ensino, sem reduzir a qualidade dos serviços oferecidos. O Brasil necessita desenvolver ações direcionadas a EaD na área da Fonoaudiologia, pois possui um território com dimensões continentais relevantes (8.514.215,3Km²) e distribuição irregular de profissionais fonoaudiólogos, o que acentua a heterogeneidade da qualidade e disponibilidade dos serviços oferecidos no país. Essa heterogeneidade é ainda agravada pela falta de uma estratégia nacional de educação continuada para atualização dos profissionais de saúde, causando diferenças importantes na capacitação dos especialistas de uma região para outra. **Objetivo:** apresentar estudos relacionados a Telessaúde realizados nos últimos cinco anos na área de Fonoaudiologia. **Conclusão:** a partir dos dados levantados observou-se a necessidade de desenvolver trabalhos nessa área, buscando a melhora na qualidade dos serviços oferecidos e facilidade de acesso a esses serviços, gerando impacto mais efetivo na prevenção, diagnóstico e tratamento dos distúrbios da comunicação.

Palavras-Chave: Telemedicina; Telessaúde; Educação à Distância; Patologias da Fala e Linguagem.

Introduction

According to the World Health Organization¹ (WHO), telemedicine is the offer of services linked to health care in cases where distance is a critical factor. These services are provided by health professionals, using information and communication technologies (ICTs) for the exchange of valid information for diagnosis, prevention and treatment of diseases and the continuous education of health service providers, as well as for research and evaluation purposes.

In general, Telemedicine is practiced in hospitals and health institutions that search for other institutions of reference to consult and exchange information, also being used on the direct assistance to the patients at their own homes².

Many times, the terms "Telemedicine" and "Telehealth" are used as synonyms or in an inseparable way. However, Telehealth refers to the use of ICT in the health department, thus being considered a more comprehensive term than Telemedicine.

One of the areas of excellence of the Telemedicine/Telehealth is the use of technologies to promote the distance learning (DL).

According to the Brazilian legislation, DL is a teaching modality that makes self-learning possible, with mediation of systematically organized didactic resources, presented in different information supports, used isolated or combined, and connected by different communication means³.

The internet expansion is crucial on the distance learning, for it allows availability of information with multimedia resources with wide access and low cost. Though the web, it is possible to construct models that explore the personalized interaction of each student, an unviable fact with conventional resources⁴.

DL has a series of advantages, among them is the fact that it reaches remote locations and includes diffused population ranges. It also makes time and space flexibility possible, making it feasible for the student to graduate, improve or to get up to date, respecting their own rhythm, at home or at their work locations⁵.

Nowadays many countries embrace the DL in all levels of education, in formal and non-formal systems, serving millions of individuals. In the universities that embrace this education modality, a reduction of costs is observed without quality change.

The nominations "DL" and "Teleducation" are also used as synonyms by the press. However,

according to Wen (2006) the latter should be used for the designation of processes optimization, an environment that unites Technologies to implement the educational capacity of the traditional methods as well as the long distance courses⁶. With this purpose, there are several technological resources that can be used for Teleducation purposes, among them:

- . videoconference (real time interaction);
- . internet based systems (Classroom of the future, On-line tutor, webconference);
- . learning objects (Homem Virtual - Virtual Man and demonstrative videos of clinical and surgical procedures).

Telemedicine and Teleducation on Speech-language Pathology

An electronic database research was carried out (Pubmed, Bireme and Dedalus) using the combination of terms: Distance learning/ Telemedicine/Telehealth and speech-language pathology/audiology, with the purpose to survey studies published in the last five years.

Twenty five studies were found, of which twenty three refer to international studies and two to national studies. Graphs 1 and 2 present the division of the studies according to the areas of Telemedicine and Speech-language pathology that they approach.

The ethics code of the American Speech and Hearing Association (ASHA) includes telepractice (long distance services) in the speech-language pathologist's practice, certifying that these professionals must prioritize the welfare of their patients and offer all the services competently. According to the ethical principles established by ASHA⁷, the professionals that use telecommunication should:

- . obey the laws and rules established by the representative organs of the class;
- . have training in the area of telepractice;
- . inform the clients how the services offered via telepractice differ from those offered face to face and clarify the risks and limitations, as well as the benefits.
- . evaluate the effectiveness of these services;
- . create a safe environment where the services will be offered;
- . use information transmission and storage methods

that keep privacy and assure confidentiality and safety.

The use of Telemedicine on Speech-language pathology offers, to rural and remote areas, the possibility of access to quality diagnosis and therapy services with decreasing costs⁸.

Researchers⁹ described the first web-based tool web for diagnosis, treatment and education from a long distance on the Speech-language pathology area. The system not only allowed speech-language pathologists to search for the adequate treatment for each patient, but also to offer information about Speech-language pathology. According to the authors, the tool was being tested and evaluated by users from Greece and United Kingdom.

A website was developed by researchers¹⁰ with the purpose of facilitating communication between non-specialist speech-language pathologists that carried out therapies for individuals with speech disorders associated with cleft palate/lip or with craniofacial anomalies, and speech-language pathologists specialized in that area. The approach made the communication between professionals easier, improving the therapy results. Moreover, the available information on the website was used in academic training programs and as a teaching tool.

A group of researchers¹¹ evaluated a multimedia application, the SoundHelper, used in the treatment of aphasic patients. The software demonstrated the correct pronunciation of the sounds of speech and was developed in video and animation format. Twenty speech-language pathologists evaluated the prototypes. The participants responded positively for both, however, the video format was the favorite, as it offered extra information. The possibility of access of the SoundHelper through the internet is being explored, since the users of augmentative and alternative communication devices demonstrated great interest on the services offered this way.

A study¹² investigated the patient's willingness to the use of long-distance resources and the factor that sway their decisions. The results showed that 75% of the participants had no knowledge about the theme and the reason of greater interest for the use of these resources was time and cost reduction. On the other hand, the explanation for not using it was the preference for the conventional treatment (face to face). The women over 55 years old were the ones who rejected the resources the most.

Several applications of Telemedicine are being investigated in the area of Audiology, including

the pure-tone audiometry¹³⁻¹⁵, the otoacoustic emissions test¹⁶, the adaptation of hearing aids¹⁷ and otoscopy/nasoendoscopy¹⁸. The Teleaudiology is promising, but is still on its primary development stages, needing systematic investigation in the areas of cost, acceptance and efficiency tests¹⁵.

Teleaudiometry is a system for real time evaluations of the hearing threshold through the internet. With this system, the exam can be done without the patients having to leave their home, needing only a computer with compatible configurations with the system's need and internet connection¹⁴.

Researchers¹⁹ evaluated the performance of a teleaudiometry system, compared to the conventional audiometry system. The teleaudiometry system estimated the hearing threshold with an error lower than 2,3dB SLP for most of the results. The authors recommended the use of this resource in places with access to the internet.

The virtual simulations have also been considered an instructional option on DL, as it presents pedagogic substance and clinical relevance²⁰⁻²¹.

In a research performed on the Brigham Young University, Utah²¹, a simulation program was created to serve the needs of Speech-language pathology students. The system allowed the execution of the audiological evaluation in different virtual patients, that already followed the program or that could be created by users. The simulation was used in class for demonstrating procedures and for the clinical practice, giving patient's profiles of both sexes and of different ages.

Lieberth and Martin²⁰ demonstrated instructional effectiveness of the audiometry simulation (virtual audiometer) for speech-language pathology students. The authors reported that the abilities needed for the execution of the auditory tests on the portable audiometer (conventional) were appropriately acquired by practice on the virtual audiometer.

The Telerehabilitation is the method which communication technologies are used to promote long distance rehabilitation. Advances in videoconference technologies and communication networks offer opportunities for patients to receive treatment at home, at school, or even at the workplace.

In a study²² that evaluated the viability and the results of a long distance service offered to six stuttering patients, it was observed that the interactive teleconference provided an effective and viable model of teleassistance in Speech-language

pathology. Every patient presented improvement with the treatment. Moreover, all the patients kept at least part of the improvement on fluency during the next six months. The authors referred that the treatment and evaluation of stuttering can be done successfully by Telemedicine.

Mortley et al.²³ demonstrated the improvement of the linguistic performance of aphasic patients that had long distance therapy. The activities suggested for the rehabilitation were provided through the internet. Most of the participants reported satisfaction with the communication improvement achieved with the treatment.

Before the need to update the methods of speech-language pathology evaluations, some authors suggested long distance evaluation, through videoconference²⁴⁻²⁷. It is pointed out that the use of this system depends on the quality of sound and image so that adequate participation of the patient and reliable data can be provided.

Brennan et al.²⁵ compared the performance of subjects with brain damage in evaluation conducted presently and distantly. Differences between the evaluation methods were not found and there was an elevated level of acceptance of the videoconference, confirming the potential for the speech-language pathology treatment using this type of technology.

Researchers²⁴ conducted an oral motor evaluation in dysarthric patients by the use of two methods: traditional (face to face) and by videoconference. They found high level of agreement between the two means of evaluation for the majority of the evaluated aspects. Similar results were found in another study²⁶, that referred the viability of the online evaluation and pointed out the need for additional refinement of the technology, besides the development of specific evaluation protocols for a reliable evaluation through the internet.

Using the same method, researchers²⁷ did not evidence the significant difference on the performance of patients with Alzheimer's disease between the two evaluation conditions. Likewise, Palsbo (2007) demonstrated that the results of the evaluation of the functional communication of aphasic patients using videoconference were equivalent to those conducted face to face.

In Brazil, a few studies have been conducted with the purpose of developing, applying and evaluating resources directed to DL.

Researchers²⁸ investigated how students of a Speech-language pathology course of a University in the city of Bauru explored the interactive means

of education. A questionnaire containing 16 multiple choice questions was elaborated and applied to 77 students. The results show that 100% of the interviewees have access to the Internet and email, 88.3% demonstrated knowledge about the DL theme, 14.3% knowledge about long distance courses, 85.7% showed interest in participating in courses of this nature and 88.3% believed that DL programs can help on the formation and on the qualification in Speech-language pathology. The authors concluded that DL is a strategy capable of optimizing the formation and improvement of the Speech-language pathology in a general way.

In regard to the creation and evaluation of didactic material for DL, a study²⁹ evinced significant difference between two evaluations, performed before and after the study through the produced material, demonstrating that the material contributed in a significant way to the student learning.

The quoted studies were projects presented in scientific events of the area, for journal publications in the last five years do not exist.

In the extent of Speech-language pathology, specifically in Audiology, a DL program is being developed and inserted in the Brazilian Program of Teleaudiology. Ferrari et al. (2004) described the first actions of this program, such as the creation of the Teleaudiology Department, which is a result of the partnership between the Speech-Language pathology Department of the College of Dentistry of Bauru and the subject of Pathology of the Medical School, both from the University of São Paulo (USP). These actions were officially launched by the Brazilian Board of Telemedicine and Telehealth, in April 2004, on the "1st Telehealth applied to Audiology Forum" during the activities of the 19th International Audiology Meeting, in the city of Bauru, São Paulo; the creation and development of the didactic material, the development of a long distance course through the internet, and the creation of the Cybertutor as a software, to execute the tele-instruction and to make it possible for the tutor to follow the progress of every student³⁰, in an interactive way..

The Virtual Man (Homem Virtual) project (www.projeto homem virtual.com.br) develops graphic computer models, 3D technology and realistic movement of the human body and has the purpose of facilitating the transmission of knowledge on health. This resource can be used for instructive means and also for patient and general public orientation.

For a country with great territorial extension, modern resources of Telemath and Telemedicine

need to be used to promote efficient integration and appraisal of the professionals involved in health activities. Today, health in Brazil has changed significantly, however even greater direction is needed for all this development in favor of the assistance with greater quality for the assisted population.

With the implementation of the family health program (FHP), around 26,000 teams see 100 million habitants of 85% of the country's cities. In this context the Health Ministry, on the decree number 35 published on January 5th, 2007, established the National Telehealth Program which has the purpose of uniting the Family Health Program teams of the many regions of the country with university centers of reference. Right now, the implementation of Telehealth in Brazil begins with a Pilot Project and the creation of nine Telehealth nucleus, in the states of Amazonas, Ceará, Pernambuco, Goiás, Minas Gerais, Santa Catarina, Rio de Janeiro and Rio Grande do Sul (National Telehealth Program).

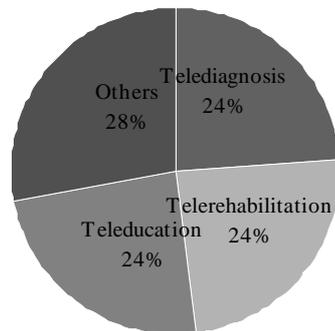
Conclusion

The international studies are distributed on the following Telehealth performance areas: teleassistance (telerehabilitation and telediagnosis) and long distance education (teleducation), showing positive results with the use of new technological resources in Speech-language Pathology.

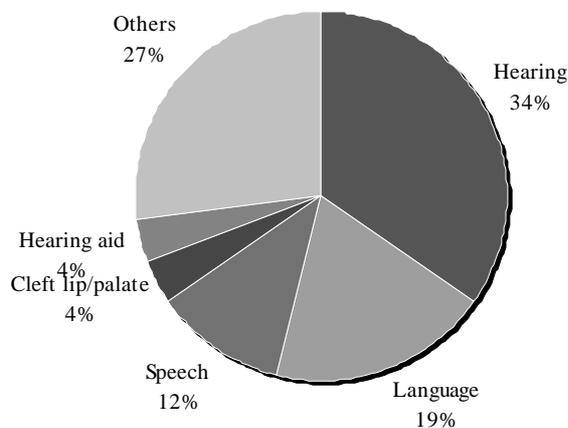
In terms of national literature, the lack of publications becomes evident in this area, along with the centralization of the studies in Audiology and regarding distance learning.

From the collected data, the need to develop projects in this area was observed, searching to improve the quality of the offered services and the facilitation of access to the services, creating more effective impact on prevention, diagnosis and intervention of the communication disorders.

GRAPH 1. Distribution of studies according to the Telehealth areas that they approach.



GRAPH 2. Distribution of studies according to the Speech-Language pathology areas that they approach.



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