

Telemedicine for hearing-impaired patients in Italy

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Received: June 16, 2024
Accepted: July 27, 2024

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How to cite this article: Ghiselli S, Sorrentino F, Lazzerini F, et al. Telemedicine for hearing-impaired patients in Italy. *Acta Otorhinolaryngol Ital* 2024;44:342-345. <https://doi.org/10.14639/0392-100X-N3116>

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Key words: teleaudiology, telemedicine, hearing loss, audiology, remote care

Dear Editor

The Italian Ministry of Health defines telemedicine as “a delivery mode of healthcare services, through the use of innovative technologies, in particular information and communication technologies, in situations where the health professional and the patient (or two professionals) are not in the same location”¹. Teleaudiology, by contrast, refers to the remote interaction between health professionals and patients for hearing loss prevention, diagnosis, and rehabilitation.

This document is promoted by the Italian Society of Otolaryngology and the Italian Society of Audiology and Phoniatrics and is the result of a collaboration between otolaryngologists, clinical audiologists, audiometric technicians, speech therapists, and hearing aid dispensers. A fundamental contribution was also made by associations of hearing-impaired people, with the legal support of the representatives of the Italian Telemedicine Association.

Our aim is to produce an overview to assist healthcare professionals and patients in the application of telemedicine in audiological clinical practice.

Hearing loss and healthcare professionals in Italy

Disabling hearing loss is defined as an audiometric threshold greater than 35 dB, as the average of the frequencies 0.5, 1, 2 and 4 kHz in the better ear².

Based on this criterion, in 2022, the Italian population included the following (Fig. 1):

- 7,200,000 people (12.5% of the total population) with a hearing loss severe enough to require the use of hearing aids and/or cochlear implants³;
- 2,600,000 people who use hearing aids (4.4% of the population)⁴;
- 17,000 cochlear implant users (0.03% of the population).

To care for this population there were:

- 4,500 doctors specialised in ENT and/or audiology;
- 15,000 speech therapists⁵;
- 1,200 audiometric technicians⁶;
- 4,500 hearing care professionals working in approximately 2,100 full-time and 3,000 part-time hearing care centres⁷.

According to National Association of Pharmaceutical Industry and Automedication, over 500,000 hearing aids have been sold in Italy in 2022⁴. On the other hand, the number of surgical procedures for implantable hearing aids⁸ was just:

- 1,400 cochlear implants and auditory brainstem implants;
- 300 bone conduction implants and middle ear implants.

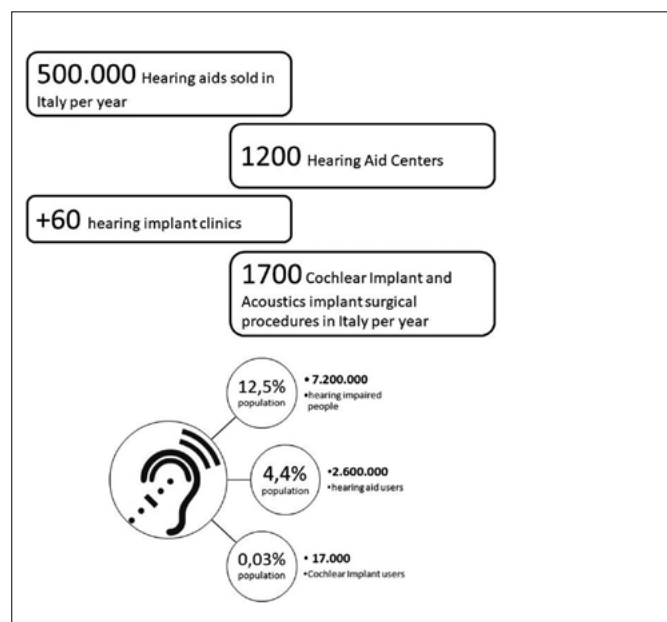


Figure 1. Hearing device practice and epidemiology.

Definitions and legal aspects of telemedicine in Italy

In 2020, a document giving national indications for the provision of telemedicine services was agreed by the Italian Government⁹. The document sets out the indications to be adopted at a national level for the provision of certain telemedicine services. The agreement distinguishes two kinds of telemedicine activity: services and operating methods. Telemedicine services include telehealth, teleconsultation and teleassistance. Telemedicine methods include telemonitoring and tele-examination.

These audiological methods and services can be provided in the following modalities:

- synchronous: the patient and physician are connected in real-time through an audio and/or video connection;
- asynchronous: information, images, videos or data are saved and transmitted for later viewing or interpretation;
- hybrid: a combination of synchronous, asynchronous and remote patient monitoring (e.g. wearable sensors, mobile apps) and/or in-person services are implemented to meet individual patient needs.

The different telemedicine activities are defined in Table I.

- tele-examination: is an act of competence of the physician-surgeon, in which the professional interacts remotely in real-time with the patient, even with the support of

a caregiver. Televisiting is intended to be limited to the follow-up of patients;

- teleconsultation: is an act of pertinence of the physician-surgeon in which the professional interacts at a distance with one or more colleagues;
- telecare: is professional care that can be provided by different healthcare professionals through remote interaction between the professional and the patient/caregiver by a video call. If necessary, the call can include sharing of data, reports or images;
- telemonitoring: is an operational mode of telemedicine that allows the remote detection and transmission of vital and clinical parameters in a continuous manner, by means of sensors that interact with the patient. The objective of telemonitoring is to move towards controlling trends in the detected parameters;

In 2022 the document 'Directions for the provision of telerhabilitation services and performances by the health professions' was approved (Agreement in the State-Regions Conference on 18 November 2021). The document included the new, more generic term "Telerehabilitation", which consists in the remote provision of clinical services aimed at enabling, restoring, improving, or in any case maintaining the psychophysical functioning of persons of all age groups.

The main regulatory sources governing telemedicine services in Italy include:

- National Guidelines for the Provision of Telemedicine Services adopted through an agreement in the State-Regions Conference on December 17, 2020;
- Decree of April 29, 2022, approving organisational guidelines containing the "Digital model for the implementation of home care";
- Regulation defining models and standards for the development of territorial assistance in the National Health Service – Ministerial Decree 77 of May 23, 2022;
- Decree of the Ministry of Health of September 21, 2022, approving guidelines for telemedicine services, functional requirements and service levels.

In Italy, there is an additional complication: regional autonomy, whereby regions independently plan and manage healthcare within their territorial jurisdiction. The Constitution assigns legislative competencies for health protection to both the State and the Regions. The State sets forth the Essential Levels of Assistance that must be ensured throughout the national territory, while regions independently plan and manage healthcare within their jurisdictional boundaries.

Table I. The different kinds of teleaudiology along with the types of practitioner and medical domain, the interpersonal relationships and technology.

Tele-health service	Practitioner	Practice domain	Relationship	Tools
Tele-examination	Physicians: ENT, audiologists, phoniaticians	Medical service	MD→PT MD→MD→PT	Web platform, software, app, dedicated medical devices
Tele-assistance	Social-health professions: audiometrists, hearing aid technicians, speech-therapists, nurses	Social-health service for patient care	SHP→PT	Hands-free system and portable remote control
Tele-monitoring	ENT, audiologists, phoniaticians, social-health professions, audiometrists, audiologists, speech therapists	Healthcare service	MD→PT (async)	Level 1: biomedical technologies with or without attachable parts Level 2: implantable medical devices (CI, BCI, MEI)
Tele-rehabilitation	Social-health professions: audiometrists, hearing aid technicians, speech-therapists	Benefits and services aimed at enabling, restoring, or improving the psychophysical functioning of patients	MD→PT SHP→PT (sync, async, hybrid)	Audiovisual tools via laptops, apps, tablets, and web platforms

MD: medical doctor; PT: patient; SHP: social-health professional; CI: cochlear implant; BCI: bone conduction implant, MEI: middle ear implant.

Audiological procedures that can be provided via telemedicine

Hearing loss is a chronic and frequently progressive condition. For these reasons, affected patients will undergo life-long audiological evaluations from diagnosis to therapy and rehabilitation. Several tests and techniques, commonly used in audiological practice, can be conducted in the context of telemedicine. Nevertheless, while there are no inherent limitations in the implementation of teleaudiology, the service offered must comply with local and national regulations. Several diagnostic audiological procedures have been described in the literature as being possible to perform remotely. Some procedures can be conducted independently by the patient while others require the presence of a previously trained facilitator. According to the British Academy of Audiology¹⁰, the procedures described above can be grouped into the following areas:

- audiometric evaluation for adults;
- audiological evaluation for paediatric patients;
- hearing aid programming and fine-tuning;
- cochlear implant programming;
- tinnitus management;
- telerehabilitation.

In conclusion, the application of telemedicine in the diagnosis and treatment of hearing impairment is currently limited to the Italian National Health Service clinics and hospitals that have a dedicated ENT and Audiology unit for the treatment of patients who use hearing devices. In particular, several audiological procedures might now be provided via telemedicine, such as cochlear implant remote checks,

hearing aid fitting, and telerehabilitation sessions. However, there are still major differences between the Italian regions due to the federalism in Italian healthcare system. Considering that telemedicine can have a positive impact on the quality of care, its use should be promoted among citizens. Moreover, the future application of teleaudiology is part of the National Telemedicine infrastructure of the National Recovery and Resilience Plan - Mission 6: Health33.

Acknowledgements

The work was supported by the Società Italiana di Otorinolaringoiatria e Chirurgia Cervico Facciale (SIOeChCF), the Società Italiana di Audiologia e Foniatria (SIAF), and by the Italian Ministry of Universities and Research (PRIN 2022, Grant n. 2022PEL99F).

The authors thank Enrico Lanzoni for the methodological support and research epidemiological data, Davide Cornolti, Bianca Garofalo, Michela Dossi, Michela Benvenuti, Eugenio Luciani and Dario Ruggieri for the clinical and structural support.

Conflict of interest statement

The authors declare no conflict of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contributions

SG, FS, AM, FL, PS: conceptualisation; GS, PS: methodol-

ogy; CR, FS, FL, AM: investigation; CR, PS, FS, SG: resources; PS, FS, FL, AM, SG: writing-original draft preparation; PS, SG: writing-review and editing.

All authors have read and agreed to the published version of the article.

References

- ¹ Italian Ministry of Health, Telemedicina: linee di indirizzo nazionali, 2014. https://www.salute.gov.it/imgs/C_17_pubblicazioni_2129_allegato.pdf. Accessed June 07, 2020
- ² WHO 2021 Report on Hearing. <https://www.who.int/publications/item/9789240020481> (accessed April 8, 2024).
- ³ CENSIS data. <https://www.censis.it/welfare-e-salute/sentirsi-bene/i-problemi-di-udito-italia-ampiezza-e-complexit%C3%A0-del-fenomeno> (accessed June 7, 2020).
- ⁴ ANIFA, Confindustria DM, 2022. <https://www.confindustriadm.it/comunicati-stampa/giornata-mondiale-udito-campagna-pubblicita-progresso> (accessed June 7, 2020).
- ⁵ White Paper on Speech Therapy, 2022. <https://fli.it/2021/11/25/rassegna-stampa-libro-bianco-sulla-logopedia-22-novembre-2021-roma> (accessed June 7, 2020).
- ⁶ National Register of Audiometric Technicians, 2020. https://www.quotidianosanita.it/lavoro-e-professioni/articolo.php?articolo_id=92555#:~:text=Gli%20Audiometristi%20in%20Italia%20sono%20circa%201.200 (accessed June 7, 2020).
- ⁷ ANA-ANAP data, 2022. https://www.quotidianosanita.it/lavoro-e-professioni/articolo.php?articolo_id=96305#:~:text=In%20Italia%20operano%20pi%C3%B9%20di,anno%2C%20circa%20450mila%20apparecchi%20acustici (accessed June 7, 2020).
- ⁸ Ministry of Health report 2022. <https://pne.agenas.it/ospedaliera/indicatori/401?tab=italia&mode=0> (accessed June 7, 2020).
- ⁹ Italian Ministry of Health. Indicazioni nazionali per l'erogazione di prestazioni di telemedicina adottato con Accordo in Conferenza Stato Regioni del 17 dicembre 2020. <https://www.statoregioni.it/media/3221/p-3-csr-rep-n-215-17dic2020.pdf> (accessed June 7, 2020).
- ¹⁰ A guide to Remote Working in Audiology Services During COVID-19 and beyond-evidence based practice: what works and why? <https://www.baaudiology.org/a-guide-to-remote-working-in-audiology-services-during-covid-19-and-beyond> (accessed June 7, 2020).