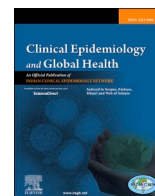




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## Review article

## Impact of COVID-19 pandemic on audiology practice: A scoping review

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## ABSTRACT

**Background:** COVID-19 has significantly impacted the professional practice of health care professionals including audiological practice. Audiologists had to adopt to changes and modify their practice to deal with the pandemic. Reasonable published work has been seen since the onset of the pandemic, depicting impact on the audiology practice across the globe in different practice settings and contexts. The present scoping review was carried out to explore the impact of COVID-19 pandemic on audiology practice and the challenges faced.

**Material & methods:** A literature search was carried out to identify the studies exploring the impact of COVID-19 pandemic on audiology practice. Three electronic databases namely Scopus, PubMed/Medline, and Cochrane Library were searched using keywords. After title and abstract screening, suitable studies were identified.

**Results:** Of the total 172, nine studies focusing on impact of COVID-19 pandemic on audiology practice COVID-19, published between January 2020 to June 2021 were included. Overall, the COVID-19 pandemic and the subsequent restrictions, caused changes in routine clinical practices in audiology. These changes were with respect to stringent infection control measures, mode of service delivery, changes in routines with reduced services or prioritizing services. Challenges included issues with remote services, experience, and support.

**Conclusion:** The present review reveals the changes in audiology practice during COVID-19 and challenges encountered by audiologists. These findings would help in better planning of audiology practice in the post pandemic world.

## 1. Introduction

Pandemics are simultaneous global transmission of infectious diseases affecting significantly large numbers of people leading to high morbidity and mortality, social, political, and economic disruption.<sup>1</sup> These pandemics have several short-term as well as long-term implications on the health care systems, especially on the healthcare professionals.<sup>2,3</sup> The coronavirus disease-19 (also called as COVID-19) emerged in Wuhan, China, and eventually rapidly spread across the globe.<sup>4</sup> The subsequent lockdowns and stay-at-home orders have led to several disruptions in availability and access to healthcare services. A recent systematic review reported a drastic reduction to almost one-third in the utilization of healthcare services, especially among persons with less severe illnesses.<sup>5</sup>

As restrictions were imposed as well as while they were being relaxed, healthcare services were either halted or reduced or shifted to online modality. These changes in service delivery were carried out to avoid the spread of infection and ensure patients are cared about. The

healthcare professionals also had to adapt to what was termed as the “new normal” for infection control measures, hand hygiene, social distancing, and changes in routine clinical procedures to reduce or prevent risk of transmission.<sup>6,7</sup>

Audiological consultation usually take place in closed sound-treated rooms. Further, multiple face-to-face appointments are required for assessment, hearing aid trial, fitting, counselling, and troubleshooting.<sup>8,9</sup> In audiology, the catastrophe of COVID-19 had a profound impact requiring modifications to existing practices as well as adaptations to the rapidly evolving situation. Professional bodies responded rapidly and provided guidelines and positional statements to help the audiologists adapt to the changing clinical scenario.<sup>10–13</sup> Tele-practice had always been an integral part of clinical practice in audiology, even before the pandemic.<sup>14,15</sup> However, the use of tele-practice got an added impetus during the pandemic.

Although the COVID-19 pandemic has limited the access and provision of healthcare services, it is equally important to continue delivering audiological services. Reasonable published work has been seen

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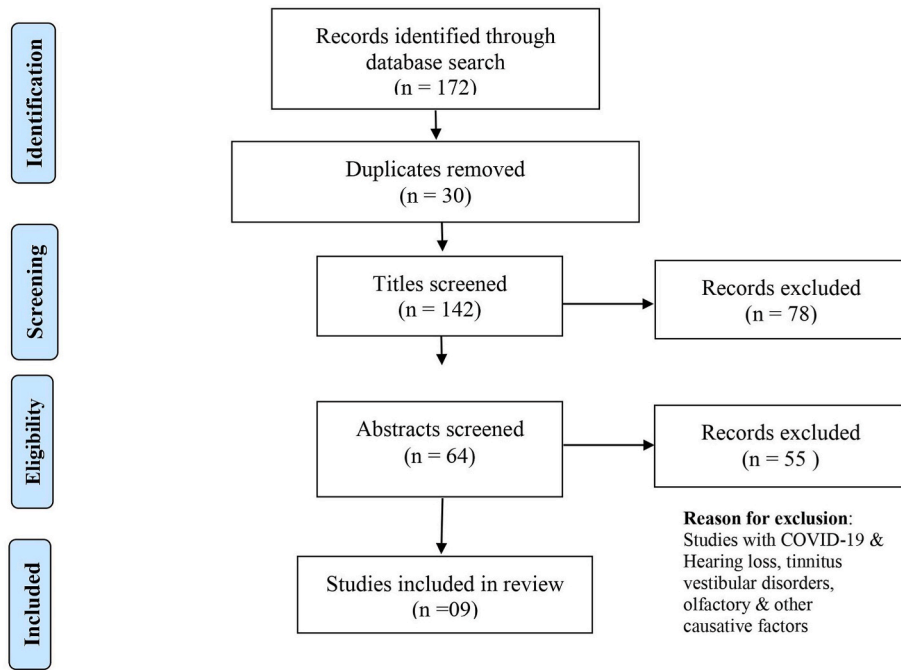


Figure 1. PRISMA flowchart explaining the steps followed in the review

since the onset of the pandemic, to study the impact on the audiology practice across the globe. It would be interesting to note the procedures adopted by audiologists to reduce risk of COVID-19 infection, and the impact and changes in professional practices due to the pandemic. Thus, the present scoping review was carried out to explore the impact of COVID-19 pandemic on audiology practice and the challenges faced.

2. Material & Methods

The scoping review was carried out using the Preferred Reporting for Systematic Review and Meta-analysis statement-extension for scoping review (PRISMA-ScR statement). The secondary data study related to COVID-19 were permitted by Ethical committee.

2.1. Literature search, inclusion/exclusion criteria

The population, intervention/impact, and outcome (PIO) was

framed. Studies carried out among audiologists (P), exploring the impact and challenges of COVID-19 pandemic (I) on their audiology practice (O) were included. Studies exploring the impact of COVID-19 on individuals with hearing loss, tinnitus, vestibular or other audiological issues were excluded. Only studies published in English language and published from January 2020 to June 2021 were included for this review.

2.2. Search methods used for identification of the studies

The search was conducted by two independent reviewers (KA, RR). The electronic databases Scopus, PubMed/Medline, and Cochrane Library were included for the review. The keywords ‘audiology’, ‘audiologist’, ‘teleaudiology’, ‘COVID-19’, ‘coronavirus-19’, were used in different combination using Boolean operators ‘AND’ and ‘OR’.

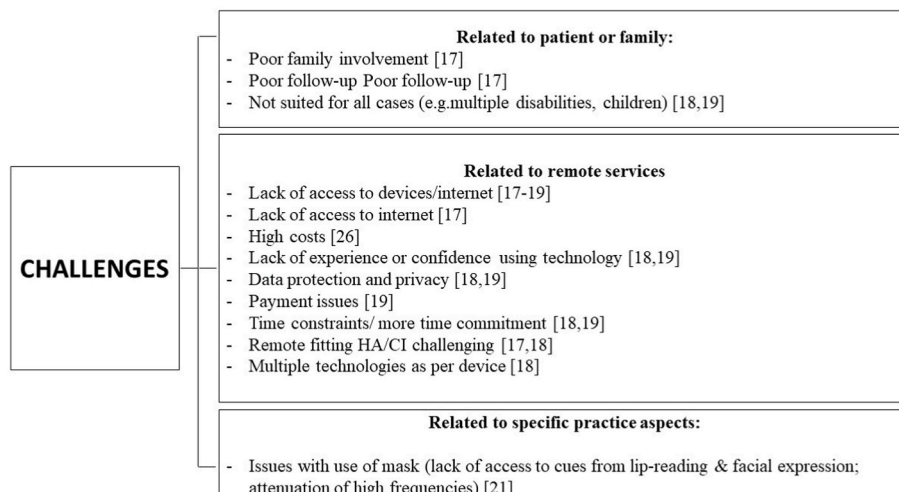


Figure 2. Challenges faced professional practice due to pandemic.

**Table 1**  
Characteristics of included studies.

Author ID	Country	Study Design/sampling	Participants details	Questionnaire details
Gunjawate et al. <sup>17</sup>	India	Cross sectional study, using convenient sampling	211 audiologists & speech-language pathologists Age: 29.8 ± 9.32 years, 21–69 years Experience: 6.99 ± 8.3 years, 1–40 years 70% females, 28.6% males, 0.5% not revealed 34.1% Bachelors, 57.8% Masters, 8.1% Doctorate 32.7% private practice, 31.3% hospital, 36% teaching and clinical services	23 items demographic details, knowledge and attitudes towards COVID-19, and practices related to infection control. Response - true/false statements, yes/no, multiple-choice questions, checkboxes, and short answer open-ended questions.
Manchaiah et al. <sup>18</sup>	South Africa (International survey from 44 countries, majority participants from five countries Australia- 81, United States- 60, South Africa- 57, United Kingdom- 14, and Canada-13)	Cross sectional study	337 audiologists 77% females, 23% males Age 44.5 years (22–81 years) Experience 18.5 years (0–53 years). Education level: • On job training, no professional degree-0.3%; Certificate course-3.9%, • Bachelor's degree-19.6%, • Master's- 38.3%, • Doctoral-38% Employment: • Private practice-42.2%, • Private hospital or clinic-6.5%, Government hospital or clinic-23.1% • Others 28.2%	50 items demographic details, effects on the workplace, use of and attitude towards telehealth, mental health status. Response – Open ended questions & structured closed set responses
Parmar et al. <sup>19</sup>	UK	Mixed-methods cross-sectional survey, snowball sampling	323 hearing care professionals (67% public sector; 28% private sector)	62 items Demographic information: Age, gender, regional location, educational qualifications, work setting, work role pre- and post- onset of COVID-19, duration of work, type of patients seen, time to commute to work Understanding about the term “Telehealth” Barriers to the delivery of telehealth Response - 58 closed-ended questions to be rated on 4-point Likert scale and 4 open-ended questions
Saunders et al. <sup>20</sup>	UK	Survey conducted using social media & personal emails, snowball sampling	120 audiologists Work settings - 75% paediatric care, 57% conduct primary evaluations with adults, 58% hearing-aids fitting, 52.5% tinnitus care, 38.3% vestibular care.	28 items • Practice patterns such as type of services provided (paediatric, adult evaluation, adult hearing-aids, tinnitus vestibular), location of practice, the number of daily appointments prior to COVID-19 restrictions. • how each type of service provided has been managed during COVID-19 restrictions. • decision-making & triaging for remote care • prior experience with remote care • views about remote care & its impacts on patient and service provision Response - five-point rating scale or open-ended questions.
Zaitoun et al. <sup>21</sup>	Jordan & Arab countries	Cross sectional Study	164 audiologists 65% female, 34% male 43.9% bachelor's degree, master's degree 39.6%, 16.5% doctoral degree 16.5%. Experience: range 1–30 years. Areas of practice - diagnostic audiology, rehabilitation sector, few in teaching	40 items across four sections • demographic details, work, years of experience, gender, age, level of education, and population group they work with, children or adults. • knowledge of the COVID-19 characteristics such (signs and symptoms, modes of transmission, incubation period, prevention methods). • audiology practice during the COVID-19 pandemic, and precautions followed while providing services to patients • audiologists' knowledge, attitude, and practice towards telehealth. Response - yes/no or multiple-choices.
Nalley et al. <sup>22</sup>	USA	Cover Story	NA	NA

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Table 1 (continued)

Author ID	Country	Study Design/sampling	Participants details	Questionnaire details
Saki et al. <sup>23</sup>	Iran	Commentary	NA	NA
Swanepoel et al. <sup>8</sup>	South Africa & USA	Cover Story	NA	NA
Thai-Van et al. <sup>24</sup>	France	Best practice recommendations	NA	NA

NA- Not applicable.

### 2.3. Screening of studies

The hits from all the search engines were compiled together and the duplicate studies were eliminated. Two researchers independently screened the titles followed by the abstract for suitability of inclusion. The full-length of the shortlisted abstracts were then retrieved. Any discrepancies were resolved through discussion to arrive at a consensus. Data extraction was conducted from the full text of the hence shortlisted articles.

### 2.4. Data extraction and management

A data extraction sheet was prepared based on the discussion among all the authors. The extraction sheet included author id, country, study design, participant details, objective of the study, questionnaire/tool used, changes in professional practice due to COVID-19 pandemic and challenges/limitations faced.

## 3. Results

The total hits across all the databases were 172 and 30 duplicates were removed. 142 titles were screened to shortlist 64 abstracts for screening. Upon screening, 64 abstracts, 9 studies were included in the final review. Fig. 1 illustrates the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) chart of the procedure followed to screen and shortlist the articles (Fig. 2).

### 3.1. Summary of included studies

The nine included studies in the review were from different countries, two from United Kingdom, one each from Jordan and Arab countries, India, France, South Africa, United States of America and Iran. One study was an international survey carried out by a group of authors from South Africa including participants from 44 countries, with most participants from five countries namely, Australia, United States, South Africa, United Kingdom and Canada. All the studies were conducted between March 2020 to August 2021. The studies included were cross-sectional surveys, best practice recommendation, cover story and commentary.

Table 1 presents the characteristics of included studies in the present review.

Table 2 presents the changes in professional practice in terms of infection control measures, shift towards remote services, workplace related changes and prioritizing services.

## 4. Discussion

The present scoping review highlights the changes in audiology practice during COVID-19. Nine studies were included in the review, these included 5 cross-sectional surveys 2 cover stories, 1 recommendation and 1 commentary. The present review helps to understand the different changes in practice in audiology as a result of the COVID-19 pandemic and the restrictions. It also helps to identify the different challenges faced by audiologists in adapting to this change.

The different changes in audiology practice reported across the included studies in the could be categorized based on broad headings

such as changes in infection control measures, shift to remote services, changes at workplace and prioritizing services. Infection control was always an important component in routine audiology practice due to direct and indirect contact with patients for prolonged duration and often for multiple visits It involves the use of probes, specula, headphones, and other instruments that are inserted in the ear. Further, most often the testing and management procedures take place in sound-treated closed setups.<sup>9,24</sup> The onset of COVID-19 and the subsequent pandemic further highlighted and calibrated the need for more stringent infection control measures. Among the studies included, 5 studies recommended the implementation of strict infection control measures. These included use of face masks, face shields, gloves, social distancing, frequent cleaning of touch surface areas, reducing patient wait time and orienting and screening the patients before the actual appointment.<sup>16,17,20–22</sup> As the pandemic continues to spread globally, it has become imperative that these infection control measures become a part of routine clinical practice.

Further, the COVID-19 pandemic hindered the standard routine audiology practice and led to exploration of the use of alternative options for service delivery. Tele practice acted as a quick alternative mode. Tele practices were identified to have the potential and longer-term opportunities since several years.<sup>25–27</sup> However, in a study by Eikelboom and Swanepoel<sup>14</sup> among audiologists from over 28 countries, reported that only 15.5% has experienced with tele-audiology. The reasons included were lack of infrastructure, cost, high case load at work limiting provision for tele practice. However, the 2019 COVID-19 pandemic brought a sudden shift to use of tele-audiology due to the unavailability of regular services. A shift of about 49–77% to remote services was reported in the included studies.<sup>16,18</sup> This shift was a quick shift and led to a sudden uptake of remote services in audiology practice. Various modalities such as telephonic consultations, remote-services, video consultations, drop-off services, no-touch and low-touch options were used for providing services.<sup>8,18,21</sup> This enabled in reducing the patient contact time to reduce the risk of infection<sup>8</sup> as well as provision of services to remote areas.<sup>17</sup>

The COVID-19 pandemic also brought about changes at the workplace for several audiologists. 92% of the audiologists stopped working during pandemic<sup>20</sup> in one study while in another only 5% audiologists provided regular care.<sup>19</sup> In yet another study, 97% reported changes within their workplace with 76.4% reporting a drop in case load.<sup>17</sup> In order to overcome with these changes, the audiologists adopted strategies such as shorter appointment timing,<sup>17</sup> involving parents or teachers,<sup>19</sup> using communication strategies.<sup>21</sup> The pandemic also made audiologists prioritize patients based on diagnosis. Patients with complaints of sudden hearing loss, monitoring of ototoxicity, vestibular management got more priority.<sup>17,19,20,22</sup>

The findings of the review helped in identifying several challenges faced by audiologists while adapting to the changed audiological practice. These were categorized based on related to patients, related to remote services or specific practice related aspects. Majority of the challenges were related to adapting to remote services. As although tele audiology was available as a alternative means of service delivery, the pandemic and the unavailability of routine services forced many audiologists to shift quickly. These studies were conducted during the lockdown and at the start of the pandemic and as time passes, the audiologists might become more well-versed with using the remote

**Table 2**  
Changes in professional practice due to pandemic.

Author ID	Infection control measures	Shift towards remote-services	Changes at workplace	Prioritizing services
Gunjawate et al. <sup>17</sup>	More than 80% used sanitizer, handwash, masks, social distancing. 39.3% with standard procedures for handwash. Need for more standard operating procedures for infection control.	77.3% expressed interest to shift to tele-practice	–	
Manchaiah et al. <sup>18</sup>	More importance to infection control measures	Higher usage of remote services and upgrading remote services	97% changes at workplace, 76.4% reduction in caseload, 38.7% reduced work hours, 25% staff cuts or closure of clinics, - differences in counselling, service delivery, triage, troubleshooting, rehabilitation - reduced appointment timings	-Higher priority to audiological support for device maintenance (53.4%), device adjustment (53.3%), cleaning and maintenance (48.4%) -Least priority to tinnitus management (72.1%), implant support services (71.4%) -Medium priority to emotional support (55.9%) and psychosocial support (62.2%)
Parmar et al. <sup>19</sup>	–	49% shifted to remote services, 56% used telephonic consultations, 20% used video consultation, 9% remote hearing screening services	No change in services (27%), redirected to other work (9%)	
Saunders et al. <sup>20</sup>	–	Remote services most often used for treating management Majority expressed interest to continue using tele-mode after lifting of restrictions (83.7%).	Majority appointments shifted to waitlist, varied alternatives used such as taking assistance from teachers of deaf, parents being asked to monitor children, doorstep drop of hearing aids, drop-off services, hybrid appointments	Most priority given to vestibular care
Zaitoun et al. <sup>21</sup>	94.5% avoided crowded places, 93.9% used sanitizer or washed hands regularly, 88.4% disinfected surfaces, 85.4% wore face masks, gloves.	Use of tele-mode for imparting services to rural areas, 56.1% could reach to patients outside the conventional work practice	82.9% minimized the waiting room time 90.9% stopped working, 92.7% established new policies for dealing with pandemic, 63.4% received new training for managing cases,	Priority areas -Assessment of sudden hearing loss (92.7%) and post meningitis patients (85.4%), follow-up of bilateral fail results in new-born hearing screening (76.2%) and vestibular disorders with risk of fall (Meiners disease & vestibular neuritis). Other areas such as hearing aids repair, earmold impression, replacement of lost aids, monitoring of ototoxicity.
Nalley et al. <sup>22</sup>	Recommended use of face masks, eye protection (goggles, face shield), hand hygiene measures (use of sanitizer- 60% ethanol or 70% isopropanol), disinfect surfaces regularly, social distancing	Encourage telehealth services	Inform patients about new guidelines in advance, pre-screen all patients. Mail-in or drop-off services for devices. Use of communication strategies – speak slowly, reduce ambient noise levels, rephrase and repeat, use of speech to text conversions/ communicator (transparent) facemask	Give priority to those with urgent needs.
Saki et al. <sup>23</sup>	Use of facemask and gloves, washing hands at least for 20 s, using hand-held ethanol alcohol solution at least for 30 s, cleaning and sterilizing the equipment after attending to each patient, disinfecting surfaces. Be updated with latest guidelines.	Promote remote care.	Limit personal interaction, especially with paediatric and geriatric population, ‘drop off’ service for hearing aid	High priority - Assessment of sudden sensorineural hearing loss, ototoxicity, idiopathic facial palsy, post meningitis followed by disorders like acute otitis media, acute mastoiditis, follow-up of new-born hearing screening, troubleshooting of hearing aid, and cochlear implant programming.
Swanepoel & Hall <sup>6</sup>		Encourage use of Web and mobile-based applications for hearing care services like hearing assessment, hearing aid troubleshooting, fine-tuning, and counselling	Audiology services based on no-touch (teleconsultation for digital proficiency assessment, hearing aid drop-off services, hearing aid troubleshooting, fine-tuning, counselling); low-touch service (screening, counter side service, self-testing kit for pure tone audiometry, speech-in-noise testing, digital otoscopy, hearing aids troubleshooting, counselling)	
Thai-Van et al. <sup>24</sup>		Video-otoscopy, pure-tone audiometry, speech-in-quiet or a speech-in-noise audiometry test, objective measures of hearing, self-administered screening or monitoring patients using smartphone or a tablet with an iOS or Android operating system. Caregivers’ role as facilitators in both		

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Table 2 (continued)

Author ID	Infection control measures	Shift towards remote-services	Changes at workplace	Prioritizing services
		synchronous and asynchronous modes. Recommended platforms for tele practice include Koalys Confirm, Koalys Consult, OtoPad, Shoebox Pro, Kuduwave Plus & Kuduwave Pro, HearTest. Use of tele-audiology for remote training of future professionals involved in the management of hearing impairment.		

service.

## 5. Conclusion

The present review explored the changes in audiology practice during COVID-19 and the challenges encountered by audiologists. This study will also help the audiologists and policymakers adjust to the audiology practice to cope with the ongoing pandemic. This study extends the directions for tele practice to become an integral part of routine practice.

## Declaration of competing interest

There is no conflict of interest to disclose.

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