Semarak International Journal of Public Health and Primary Care

Journal homepage:
https://semarakilmu.my/index.php/sijphpc/index
ISSN: 3030-5519

Integrating Remote Hearing Aid Adjustments: A Practical Guide Across Hearing Aid Manufacturers

Mohd Fadzil Nor Rashid[1,*], Aw Cheu Lih[1], Wan Najibah Wan Mohamad[1], Hasrul Hosshan[3],Quar Tian Kar[3,4]

[1] Audiology Programme, School of Health Sciences, Health Campus, Universiti Sains Malaysia, Kelantan, Malaysia
[2] Centre for Rehabilitation and Special Needs (iCaRehab), Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia
[3] Center for Inclusive Research on Community and Disability (CIRCLE),Fakulti Pembangunan Manusia, Universiti Pendidikan Sultan Idris, Perak, Malaysia
[4] Audiology Programme, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

ARTICLE INFO

Article history:
Received 3 November 2024
Received in revised form 18 November 2024
Accepted 1 December 2024
Available online 15 December 2024

Keywords:
Remote hearing aid; teleaudiology; practical; audiology students; audiologists

ABSTRACT

Integrating remote hearing aid adjustments into audiological care has significantly transformed hearing healthcare delivery, particularly in enhancing accessibility and convenience for patients. This transition accelerated during the COVID-19 pandemic, has allowed audiologists to remotely program hearing aids, manage tinnitus, and conduct follow-up consultations, reducing the need for in-person visits. Despite the growing acceptance of teleaudiology, challenges still need to be addressed in understanding and implementing remote care across different hearing aid manufacturers. This review provides a practical guide for audiologists and clinical audiology students to navigate remote hearing aid adjustments for five major manufacturers: GN Resound, Unitron, Starkey, Phonak, and Oticon. The study utilised a comparative approach, evaluating each manufacturer's remote platforms, focusing on ease of use, patient engagement, and clinical outcomes. The review revealed that all five manufacturers provide robust remote programming features, including real-time adjustments, patient feedback tools, and tinnitus management solutions. Key differences were in platform usability, flexibility in asynchronous versus synchronous adjustments, and the overall patient experience. The principal results highlight that when appropriately integrated, remote adjustments can match the effectiveness of in-person visits, offering a sustainable model for hearing healthcare. Challenges such as patient education, technology compatibility, and ensuring patient readiness were identified as crucial factors to consider. The findings suggest audiologists should focus on preparation, ongoing communication, and follow-up care to optimise remote services. In conclusion, remote hearing aid adjustments, supported by the evolving teleaudiology platforms of leading manufacturers, are set to play an essential role in future audiological care. This guide provides essential insights into the practical application of these technologies, enhancing the delivery of patient-centred, remote hearing healthcare.

* *Corresponding author.*
E-mail address: fadzilnor@usm.my

https://doi.org/10.37934/sijphpc.2.1.110 b

1. Introduction

According to the World Health Organization (WHO), more than 5% of the global population, equating to approximately 430 million individuals, including 34 million children, need rehabilitation to manage disabling hearing loss. By 2050, projections indicate that over 700 million people, or 1 in 10 individuals, will experience disabling hearing loss, defined as a hearing loss greater than 35 decibels (dB) in the better-hearing ear [1]. In audiology, hearing threshold levels for each ear are generally categorised rather than described by specific frequencies on a pure-tone audiogram. Typically, four descriptors are used based on the average air conduction thresholds: mild (21-40 dB HL), moderate (41-70 dB HL), severe (71-95 dB HL), and profound (over 95 dB HL) [2].

The effect of hearing loss may be different between children and adults. In general, hearing is very important for learning and language development among children; thus, hearing loss may lead to delayed speech and language skills, learning difficulties in school, low self-esteem, and social issues [3]. For example, children with hearing loss may not hear their voices clearly, making them speak too softly or loud and sometimes with high-pitched sounds. Age-related hearing loss is one of the most prevalent sensory impairments and ranks third most common chronic health issue among adults. This type of hearing loss in older individuals stems from a complex interaction of factors, including cochlear ageing, environmental and lifestyle exposures, genetic and biological predispositions, and other medical conditions [4].

Prescribing a hearing aid to a client diagnosed with hearing loss is part of the rehabilitation process managed by audiologists and a multidisciplinary team. Hearing aids are sophisticated electroacoustic devices designed to function in challenging physical and acoustic conditions, facing constraints like limited power, compact size, and the close placement of microphones and receivers [5]. Their development and operation involve professionals from diverse fields, including audiology, engineering, psychology, and ergonomics, working in various institutions such as hospitals, companies, and universities. This broad, multidisciplinary involvement makes hearing aid research particularly complex and demanding. Regarding hearing aid usage globally, there is a substantial unmet need for hearing instruments, as less than 11% of people with disabling hearing loss are hearing aid users. Different strategies are required to pave the way for improvements and address the underlying barriers to hearing healthcare [6].

Integrating remote hearing aid adjustments and tinnitus management into audiological care has revolutionised hearing healthcare delivery, particularly in response to the growing need for accessibility and convenience. The advent of teleaudiology has enabled audiologists to remotely program hearing aids, perform follow-up consultations, and provide ongoing care without requiring patients to travel to a clinic [7,8]. This shift towards remote care was significantly accelerated during the COVID-19 pandemic, which necessitated the rapid adoption of teleaudiology practices across the globe, including in countries like Australia, where clinic owners, managers, and reception staff reported increased utilisation of these practices [9].

The efficacy of remote hearing aid programming has been the subject of numerous studies, with findings consistently demonstrating that remote adjustments are as effective as in-person fittings regarding patient satisfaction and outcomes [10,11]. In addition to hearing aid programming, teleaudiology offers a unique platform for managing tinnitus, a condition that affects a significant proportion of individuals with hearing loss. Teleaudiology allows for the remote provision of counselling and sound therapy, both essential components of tinnitus management [12,13].

Moreover, teleaudiology is not just a stopgap measure during crises but a sustainable model that promises to improve access to hearing healthcare, particularly in rural and underserved areas [14,15]. Studies have shown that remote consultations and adjustments can reduce travel time, lower costs,

and minimise the burden on patients and healthcare providers [16-18]. As the technology continues to evolve, audiologists must be equipped with practical knowledge across different hearing aid manufacturers to effectively integrate remote adjustments and tinnitus management into their practice.

This review aims to provide a comprehensive guide for audiologists and audiology clinical students on integrating remote hearing aid adjustments, drawing on evidence from the guidelines and practical insights from various hearing aid manufacturers. By synthesising current knowledge and addressing the unique challenges associated with teleaudiology, this guide seeks to enhance the delivery of remote audiological care in a rapidly changing healthcare landscape. Specifically, this practical explores five leading hearing aid manufacturers' remote adjustment and tinnitus management capabilities: GN Resound, Unitron, Starkey, Phonak, and Oticon. We will examine each manufacturer's approach and provide general guidelines for practical use. Additionally, we will discuss lessons learned from implementing these technologies and conclude with the implications for future audiology practice.

2. Methodology

2.1 Study Design

This study employed a descriptive methodology to explore the features and practicality of remote hearing aids fine-tuning. The focus was to synthesise information sourced exclusively from the official websites of five hearing aid manufacturers [19-23]. This approach allows for a comprehensive understanding of the advancements in remote hearing aid technology and how these innovations cater to user needs.

2.2 Data Source

The primary data for this review were collected from five hearing aid manufacturers' websites, ensuring a broad representation of available products. These sources included official company websites, product handouts, user manuals, and promotional materials. Specific criteria guided the selection of materials to ensure that only relevant and authoritative information was included. Materials for this study were selected by two primary criteria: relevance and recency. First, relevance was ensured by including only documents that specifically addressed remote hearing aid technologies. These included detailed product descriptions, technical specifications, and a remote features and functionality guide. Second, priority was given to the most recent information available to capture the latest advancements and trends in hearing aid technology. This approach ensures that the findings reflect the current state of innovation in the field, where technology continues to evolve rapidly.

2.3 Data Extraction and Analysis

Data from the selected materials was systematically extracted with attention to three key areas. First, essential functionalities of remote hearing aids were identified, including connectivity options like Bluetooth and app integration, interfaces, and remote adjustment capabilities for audiologists and users alike. Next, the study gathered insights into user benefits, focusing on features that enhance accessibility and convenience, such as real-time adjustments, remote troubleshooting, and access to virtual support services. Finally, a comparative analysis of models from five manufacturers was conducted, highlighting differences in application and technology integration. This comparison

provides valuable context for understanding market diversity and the unique approaches manufacturers take within remote hearing aid technology. The extracted information was analysed qualitatively, enabling the identification of scope areas within the data.

2.4 Ethical Considerations

Ethical approval was not required because this study relied solely on publicly available information. However, proper attribution was given to all manufacturers referenced throughout the study. This acknowledgement is crucial for maintaining academic integrity and recognising the contributions of industry stakeholders.

3. Result

3.1 Description of Manufacturers

Oticon's RemoteCare platform offers a robust solution for remote fittings and adjustments. It is particularly well-suited for initial fittings, where audiologists can conduct comprehensive assessments and fine-tuning remotely. The platform also supports data transfer from existing hearing aids, enabling seamless updates and adjustments based on previous settings. Oticon's focus on patient education and preparation before the remote session ensures that patients are well-equipped to participate in their care. Oticon's platform is designed with the patient and clinician in mind, ensuring that remote sessions are as practical as in-person appointments. The emphasis on thorough preparation and follow-up care highlights the importance of continuous support in teleaudiology.

GN Resound has made significant strides in teleaudiology through its ReSound Smart 3D and ReSound Assist platforms. The ReSound Smart 3D app allows patients to make fine adjustments to their hearing aids, including volume control, program selection, and sound personalisation, directly from their mobile devices. The app's Tinnitus Manager feature enables users to adjust the pitch and variation of sound from the tinnitus sound generator, which can relieve tinnitus symptoms. Through ReSound Assist, audiologists can remotely update hearing aid settings based on patient feedback, reducing the need for in-person visits. One of GN Resound's strengths is its focus on ease of use. The apps are designed to be intuitive, ensuring that even those with limited technological experience can navigate them comfortably. This accessibility has increased patient engagement and satisfaction with remote services.

Phonak's Remote Support feature, integrated into the Phonak Target software, allows for seamless follow-up fittings from a distance. The process begins with an invitation sent through the myPhonak app, which connects the patient to a video call with their audiologist. During the session, real-time adjustments can be made to the hearing aids, ensuring they are optimised for the patient's environment. The platform also includes features for monitoring battery life and connection stability, ensuring a smooth experience for both the patient and the audiologist. Phonak's focus on maintaining a stable connection and providing real-time support makes it an excellent choice for patients who require frequent adjustments. The ability to make live changes while communicating with the patient ensures that the hearing aids are finely tuned to their needs, reducing the likelihood of follow-up issues.

Unitron's Remote Adjust feature, integrated with its Unitron TrueFit™ software, allows for comprehensive remote adjustments. Audiologists make adjustments within the software, which then sends the updates securely to the Sonova cloud. Clients receive a notification on their smartphone via the Remote Plus app, alerting them that an adjustment is ready. With a simple tap,

clients can apply the adjustment directly to their hearing devices. To ensure ease of use, the process is designed to be intuitive and efficient. When an audiologist sends an adjustment, the client automatically receives a push notification. They can then tap the notification or navigate to the Devices > Remote Adjust section in the Remote Plus app to apply the change by selecting "Apply adjustment." Upon application, a beep confirms that the adjustment is successfully made. If clients wish to revert to their previous settings, they can easily do so by selecting "Original Adjustment" within the app.

Starkey's TeleHear platform provides synchronous (real-time) and asynchronous (delayed) remote programming options. Synchronous remote programming involves a live audiovisual connection between the audiologist and the patient, allowing for real-time adjustments. This method is beneficial for complex cases where immediate feedback is necessary. Asynchronous programming, on the other hand, will enable patients to submit help requests through the Starkey app, which audiologists can address at their convenience. TeleHear's dual approach offers flexibility for both patients and clinicians. The asynchronous option, in particular, is beneficial for routine adjustments that do not require immediate interaction, thus saving time for both parties. Starkey's comprehensive platform supports various fitting tasks, including quick fit, fine-tuning, and feedback management.

3.2 Comparison between Manufacturers

The rapid advancement of teleaudiology has transformed the landscape of hearing healthcare, offering innovative solutions for remote hearing aid management. Table 1 provides a comparative analysis of five leading manufacturers—Oticon, GN Hearing, Phonak, Unitron, and Starkey—highlighting their essential functionalities, user benefits, and unique teleaudiology features. Each manufacturer has developed distinct connectivity options, interfaces, and remote adjustment capabilities that cater to the diverse needs of users and audiologists alike. By emphasising ease of use and flexibility, these platforms not only enhance accessibility and convenience for patients but also empower audiologists to deliver personalised care beyond traditional clinic settings. This comprehensive overview underscores the evolving nature of remote hearing aid technology and the importance of tailored solutions in improving patient engagement and satisfaction.

Table 1
Comparative Analysis of Remote Hearing Aid Manufacturers

Manufacturer	Connectivity Options	Interfaces	Remote Adjustment Capabilities	User Benefits	Notable Features	Teleaudiology Features	Ease of Use	Flexibility for Audiologists
Oticon	Bluetooth, App Integration	Oticon RemoteCare App	Audiologist remote access, user adjustments	Real-time adjustments, virtual support	First Fit Quick Guide for ease of initial setup	RemoteCare platform supports comprehensive assessments and adjustments	Emphasis on patient education for effective participation	Robust solution for remote fittings; data transfer from existing aids
GN ReSound	Bluetooth	ReSound Smart 3D App or ReSound Smart App	Remote fine-tuning and troubleshooting	Tinnitus management, access to virtual support	Tinnitus Manager for enhanced auditory experience	ReSound Assist allows audiologists to update settings remotely	Intuitive design for users with limited tech experience	Care beyond clinic settings; boosts patient engagement
Phonak	Bluetooth, App Integration	myPhonak App	Remote support from audiologists	Convenience of remote consultations, enhanced accessibility	Comprehensive fitting guide for seamless adjustments	Remote Support with video calls for real-time adjustments	Stable connection and seamless experience	Continuous follow-up fittings; excellent for frequent adjustments
Unitron	Bluetooth	Remote Adjust App	User-initiated adjustments, audiologist support	Increased user control over hearing preferences	User-friendly interface for easy access	Remote Adjust feature with smartphone notifications	Simple and effective design	Supports care for patients in underserved areas
Starkey	Bluetooth, App Integration	My Starkey (TeleHear app)	Audiologist remote adjustments, user control	Enhanced troubleshooting, immediate virtual assistance	TeleHear Handbook for comprehensive user guidance	Synchronous and asynchronous remote programming options	Flexibility in communication; supports complex cases	Comprehensive platform for fitting tasks; efficient follow-ups

4. Discussion

Research has extensively demonstrated that remote hearing aid fitting is a viable alternative to in-person programming for initial fittings and follow-ups [10,11]. Previous studies have shown comparable outcomes between remote and in-person hearing aid programming, with high user satisfaction and improved accessibility being key benefits [24,25]. For instance, Blyth and Saunders [25] stated that patients were generally highly satisfied with the service, and for 1 in 3, it was their preferred mode of future hearing-aid fitting. They also suggested that future services should be aware that a one-size-fits-all approach will only satisfy some patients and that teleaudiology should be offered based on individual preference.

Audiologists often face technical difficulties, including connectivity issues, software compatibility, and device malfunctions, which can hinder effective remote programming. Despite only minor technical challenges, an ongoing concern is clinicians' reluctance to relinquish some "control" over the fitting process. Enabling patients to take a more active role in remote fitting and fine-tuning could reshape the practitioner's role. Additionally, ensuring patient education and technological literacy is crucial, as patients unfamiliar with remote technologies may require tailored guidance to use these services effectively [26]. Furthermore, determining when in-person visits are indispensable, such as for complex fittings or physical ear mold modifications, remains a significant consideration. Highlighting these challenges ensures a comprehensive discussion and equips audiologists to anticipate and address potential barriers in implementing remote care. Within the scope of teleaudiology, a Malaysian study examined audiologists' views, finding that while half believed teleaudiology could enhance care quality, accessibility, and professional practice, the other half were uncertain or disagreed [27]. Additionally, various studies in Malaysia have explored teleaudiology in contexts such as special education [28], higher education [29], COVID-19 [30], and engineering collaboration [31].

For instance, there is limited data on the long-term impact of remote hearing aid adjustments on patient outcomes, including adherence, auditory performance, and satisfaction. Further exploration is needed into the most effective communication strategies for teleaudiology consultations, especially when managing patients with complex needs or low technological proficiency [32]. Another area for investigation is the potential for artificial intelligence and machine learning to enhance remote adjustments, including automated troubleshooting and real-time performance monitoring.

4.1 General Guidelines for Remote Hearing Aid Adjustments

Implementing remote hearing aid adjustments and tinnitus management has revealed several key lessons for audiologists. First, patient education is critical. Many patients, particularly older adults, may struggle with technology, and thorough preparation can prevent technical issues during the session. Second, maintaining clear communication throughout the process is essential. Remote care requires a higher level of communication to ensure the patient understands the adjustments and how to use their hearing aids effectively. Finally, while remote care is a powerful tool, there are other options for in-person visits in some cases. Audiologists must carefully assess when remote care is appropriate and when a face-to-face consultation is necessary. The general guidelines for five manufacturers have been summarised below:

1. *Ensure Compatibility:* Always confirm that the patient's hearing aids and mobile devices are compatible with the manufacturer's remote adjustment platform. Compatibility issues can lead to frustration and unsuccessful sessions.
2. *Conduct an Initial Assessment:* Evaluate whether the patient is a good candidate for remote care. Conditions like severe hearing loss or the need for complex adjustments may still require in-person visits.
3. *Prepare the Patient:* Provide clear instructions on setting up their devices and using the app before the session. Patients who are comfortable with the technology are more likely to have successful outcomes.
4. *Customise Settings Based on Patient Needs:* Tailor the remote adjustment process to address the patient's needs. This includes adjusting sound quality, tinnitus management, and environmental noise reduction.
5. *Follow-Up:* Regular follow-up is essential to ensure adequate remote adjustments. Schedule check-ins to monitor the patient's progress and make further adjustments as needed.
6. *Educate Patients:* Provide educational resources to help patients understand how to use the remote platforms effectively. This includes troubleshooting tips and guidance on when to seek additional help.
7. *Maintain Security and Privacy:* Ensure that all remote sessions comply with privacy regulations and that patient data is protected.

5. Conclusion

The integration of remote hearing aid adjustments and tinnitus management by manufacturers such as GN Resound, Unitron, Starkey, Phonak, and Oticon has transformed the field of audiology. These platforms enable audiologists to provide high-quality patient care regardless of location, making hearing healthcare more accessible and convenient. By following best practices and learning from the experiences of implementing these technologies, audiologists can optimise the benefits of remote care. While challenges remain, particularly in ensuring patient readiness and technology compatibility, the potential of remote hearing aid management is undeniable. As teleaudiology continues to evolve, these systems will play an increasingly central role in delivering patient-centred care.

Acknowledgment

This research was funded by a grant from Universiti Sains Malaysia, Short-Term Grant with Project No: 304/PPSK/6315805

References

[1] World Health Organization. "Deafness and Hearing Loss." World Health Organization. Last modified February 2, 2024. https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss.
[2] British Society of Audiology. Recommended Procedure: Pure-Tone Air-Conduction and Bone-Conduction Threshold Audiometry with and without Masking. August 2018. https://www.thebsa.org.uk/wp-content/uploads/2023/10/OD104-32-Recommended-Procedure-Pure-Tone-Audiometry-August-2018-FINAL-1.pdf
[3] American Speech-Language-Hearing Association. "Effects of Hearing Loss on Development." Accessed October 26, 2024. https://www.asha.org/public/hearing/effects-of-hearing-loss-on-development/.
[4] Bowl, Michael R., and Sally J. Dawson. "Age-related hearing loss." *Cold Spring Harbor perspectives in medicine* 9, no. 8 (2019): a033217.
[5] Popelka, Gerald R., Brian CJ Moore, Richard R. Fay, and Arthur N. Popper, eds. Hearing aids. Vol. 56. Berlin Heidelberg: Springer, 2016.

[6] Bisgaard, Nikolai, Stefan Zimmer, Mark Laureyns, and Jennifer Groth. "A model for estimating hearing aid coverage world-wide using historical data on hearing aid sales." *International journal of audiology* 61, no. 10 (2022): 841-849.
[7] Mashmous, Maryam Hussein Abdullah Ba. "Efficacy of Remote Hearing Aids Programming Using Teleaudiology: A Systematic Review." *E-Health Telecommunication Systems and Networks* 11, no. 1 (2022): 14-33.
[8] Tao, Karina FM, Christopher G. Brennan-Jones, Dona MP Jayakody, De Wet Swanepoel, Gaetano Fava, Sandra R. Bellekom, and Robert H. Eikelboom. "Validation of teleaudiology hearing aid rehabilitation services for adults: a systematic review of outcome measurement tools." *Disability and Rehabilitation* 44, no. 16 (2022): 4161-4178.
[9] Bennett RJ, Kelsall-Foreman I, Barr C, Campbell E, Coles T, Paton M, et al. Utilisation of tele-audiology practices in Australia during the COVID-19 pandemic: Perspectives of audiology clinic owners, managers and reception staff. *Australian Journal of Audiology* 45, no.2 (2023): 163-169.
[10] Spasari M, Ueda S, Aarts R, Ball K, Hickson L. Teleaudiology vs in-person hearing aid fittings: A comparative study of client satisfaction. *International Journal of Audiology* 62, no.8 (2023): 568-575.
[11] Smith G, McDonald M, Legg S. Remote versus in-person hearing aid fittings: Patient outcomes and satisfaction. *Journal of the American Academy of Audiology* 34, no.5 (2023) : 405–413.
[12] Lee S, Kim S, Lee J, Yoo M, Lee J. The role of teleaudiology in tinnitus management: A review. *Journal of Audiology and Otology* 26, No.2 (2022) :45–56. Available from: https://doi.org/10.7874/jao.2022.0012
[13] Dent M, Craven D, Miller K, Cantrell S, Wilson C. Tinnitus management using teleaudiology: Efficacy and patient satisfaction. *Ear and Hearing* 44, No.1 (2023) : 37–45.
[14] Hohmann V, Brendel S, Klenzner T, Grosse S, Rösler A. Teleaudiology in underserved areas: An analysis of service delivery models. *Hearing Review* 29, No.7 (2022): 22–26.
[15] Wang Y, Chen M, Liu J, Wang S, Sun Y. The impact of teleaudiology on healthcare access and patient outcomes. *Journal of Telemedicine and Telecare* 29, No.3 (2023): 147-155.
[16] Patel S, Li T, Brown R. Benefits of teleaudiology: A cost-effectiveness analysis. *Health Economics Review* 12, No.1 (2022): 14.
[17] Johnson E, Harrison B, Allen C, Graham M. Teleaudiology: Cost savings and patient outcomes. *Telemedicine Journal and e-Health* 29, No.9 (2023):945–952.
[18] Cooper H, Hughes M, Baines J, Cramer R. Reducing the burden on patients and providers through teleaudiology. *Journal of Telehealth and Telecare* 29, No.5 (2023):299–308.
[19] Oticon. RemoteCare: First Fit Quick Guide. Last modified 2020. Accessed October 28, 2024. https://www.oticon.com/-/media/oticon-us/main/professionals/tools-and-support/remotecare/20-44708---15555-0674---rm---remotecare---first-fit-quick-guide---2.pdf.
[20] GN Hearing. Tinnitus Manager Assist User Guide. Accessed October 28, 2024. https://www.gnhearing.com/-/media/partnerportal/resound/products/apps/smart%203d%20app/400756011us-gu-tinnitusmanager-assistuserguide-.ashx.
[21] Phonak. Fitting Guide: Remote Support for Phonak Target 6.2. Last modified 2020. Accessed October 28, 2024. https://www.phonakpro.com/content/dam/phonakpro/gc_hq/en/resources/digital-journey/documents/PH_Fitting_Guide_Remote_Support_Phonak_Target_6.2_EN_V2.00.pdf.
[22] Unitron. Remote Adjust Guide. Accessed October 28, 2024. https://www.unitron.com/content/dam/echo/pdfs/Remote%20Adjust%20Guide.pdf.
[23] Starkey Hearing Technologies. TeleHear Handbook. Accessed October 28, 2024. https://cdn.mediavalet.com/usil/starkeyhearingtech/O11lgm1ohkyzWBi3vHANAw/od0gYX-8ikGMUdFfB4r_3g/Original/TeleHear%20Handbook.pdf.
[24] Angley, Gina P., Jean Anne Schnittker, and Anne Marie Tharpe. "Remote hearing aid support: The next frontier." *Journal of the American Academy of Audiology* 28, no. 10 (2017): 893-900.
[25] Blyth, Matthew, and Gabrielle H. Saunders. "Remote hearing-aid delivery and support: perspectives of patients and their hearing care providers." *International Journal of Audiology* (2024): 1-9.
[26] Eikelboom, R. H., & Swanepoel, D. W. (2016). International survey of audiologists' attitudes towards telehealth applications in hearing care. *Telemedicine and e-Health* 22, no.6 (2016): 478–483.
[27] Rashid, Mohd Fadzil Nor Bin, Tian Kar Quar, Foong Yen Chong, and Nashrah Maamor. "Are we ready for teleaudiology?: data from Malaysia." *Speech, Language and Hearing* 23, no. 3 (2020): 146-157.
[28] Rashid, Mohd Fadzil Nor, Nashrah Maamor, Chong Foong Yen, and Quar Tian Kar. "Development of Teleaudiology Service in Special Education Service Centre in Malaysia: Lessons Learned." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 34, no. 1 (2024): 289-298.
[29] Rashid, Mohd Fadzil Nor, Wan Najibah Wan Mohamad, Mahamad Almyzan Awang, and Mohd Normani Zakaria. "Adaptation of Teleaudiology Approach in Undergraduate Clinical Examinations: Lesson Learned." In *Proceedings*, vol. 82, no. 1, p. 18. MDPI, 2022.

[30] Quar, Tian Kar, Mohd Fadzil Nor Rashid, Muhd Yusran Mohd Rosdi, Wan Syafira Ishak, and Foong Yen Chong. "Impact of the COVID-19 Pandemic on Individuals With Hearing Loss and Audiology Practice in a Developing Country." *American Journal of Audiology* 32, no. 1 (2023): 59-69.
[31] Rashid, Mohd Fadzil Nor, M. R. Isa, Mahamad Almyzan Awang, Quar Tian Kar, and Mohd Normani Zakaria. "Teleaudiology and calling for engineering collaboration: A state of art review." In *AIP Conference Proceedings*, vol. 2571, no. 1. AIP Publishing, 2023.
[32] Swanepoel, De Wet, and James W. Hall III. "A systematic review of telehealth applications in audiology." *Telemedicine and e-Health* 16, no. 2 (2010): 181-200.