TeleHear AI: Generative AI-Driven Hearing Care

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Key takeaways:

- TeleHear AI provides advanced generative AI driven real-time hearing aid support for patients in complex listening environments, complementing professional care, allowing for an enhanced patient experience.
- TeleHear AI achieves a 93% accuracy rate in understanding user queries. Moreover, 84% of participants found it user-friendly and helpful in managing their hearing-related issues.

Introduction

Advancements in hearing aid (HA) technology and fitting algorithms have significantly improved initial outcomes. However, fine-tuning remains essential for ensuring user satisfaction and successful adoption—especially during the early stages of use. While in-clinic adjustments by hearing care professionals are valuable, their impact can be constrained by practical challenges such as scheduling follow-up visits, patients struggling to recall specific listening difficulties, and the inherently subjective nature of patient feedback. Moreover, clinic environments cannot fully capture the complexity of real-world listening environments, making it difficult to completely address real-world performance issues. These limitations underscore the need for tools that extend the clinician's reach, enabling ongoing, real-time support that complements professional care and helps address patients' challenges as they occur in daily life.

To meet this need, Starkey—an industry leader in applying artificial intelligence (AI) to hearing healthcare —introduces a transformative solution: TeleHear AI, a next-generation feature that enables real-time hearing aid support.

Leveraging the power of advanced generative AI, TeleHear AI can interpret user queries, identify topics of interest and implement simple, automated hearing aid adjustments. Whether users encounter sudden changes in background noise or have questions about their hearing aids, TeleHear AI is designed to deliver immediate support.

This solution was created to enhance professional care by reducing the burden of minor follow-ups and enhance patient satisfaction. By combining professional expertise with intelligent, self-guided tools, Starkey's TeleHear AI supports a more continuous, responsive, and individualized hearing care experience.

Feature Overview

TeleHear AI helps resolve everyday hearing challenges via a smart, mobile-based assistant. Patients can interact with the tool using natural, conversational language, to cover topics ranging from guidance on existing features to suggested hearing aid settings.

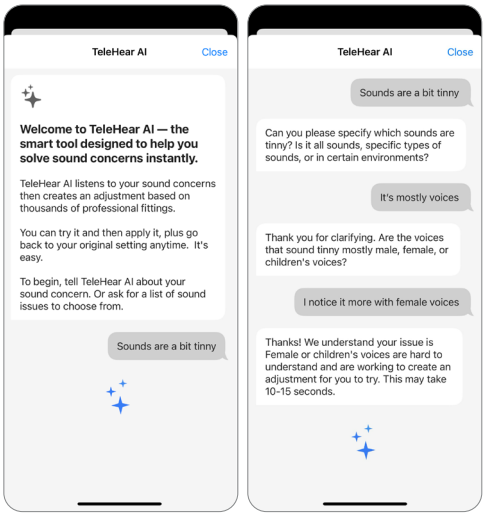

Figure 1:Example interaction between a hearing aid user and TeleHear AI.

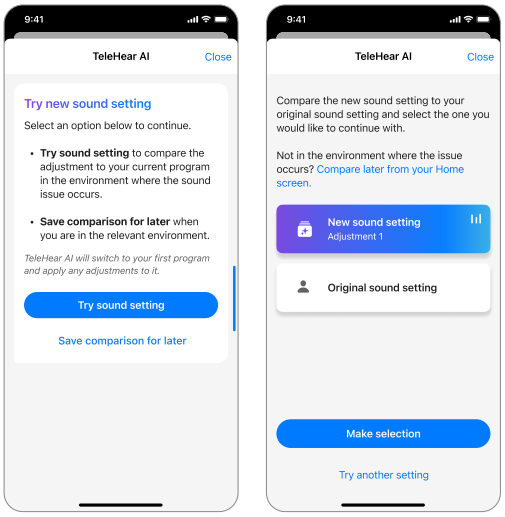

Figure 2: Example user A/B comparison testing of suggested HA adjustments for an identified issue.

As illustrated in Figure 1, users initiate the interaction by typing in their questions. The AI then analyzes the input, identifies the key topic queried, and provides a response. In an example *(Figure 2)*, the user struggles with a recent change in perceived clarity during conversations. TeleHear AI identifies this key topic and provides a suggested change to their hearing aid setting. Any proposed changes to fitting parameters follow clinical best practice. Users can evaluate the suggested settings and decide whether to apply them or revert to the original configuration—putting control in their hands.

Research Studies

Pilot Study: Procedure

Eleven hearing care professionals were invited to evaluate the TeleHear AI feature. For each supported category, participants engaged with the AI assistant in at least three separate conversations, varying the way they described the question to reflect how their patients might ask a similar question. After each interaction, they recorded whether the assistant accurately identified the described problem.

Pilot Study: Results

In a total of 365 interactions, the TeleHear AI assistant correctly identified the user-described problem 93% of the time, demonstrating strong language understanding and problem identification capabilities. To further enhance its performance, the AI assistant was retrained in areas where it had shown lower accuracy before advancing to the next phase of patient testing.

Validation Study Phase I

Participants

Twenty-two adults with bilateral hearing loss (mean age = 67.9 years, 10 male and 12 female), ranging from mild to severe hearing loss were recruited into this study.

Participants were divided into two groups: one group participated in a lab session, while the other group engaged in a field trial. All participants underwent audiometric testing and initial hearing aid fitting at the start of the study.

Lab Session Procedure

Twelve experienced bilateral hearing aid users (average hearing aid usage: 9 ± 4.6 years) participated in this segment of the study. Each was fitted with Starkey hearing aids and best-fitted to e-STAT 2.0.

Participants were seated in a sound-treated booth and listened to pre-recorded sounds representing common acoustic environments that would elicit hearing problems addressed by the TeleHear AI feature. Each query was associated with a set of three related sound samples. Using an interactive interface, participants played these samples at their own pace and provided feedback on the sounds heard (e.g., too loud, annoying, unclear).

Study researchers reviewed participant feedback and confirmed whether it aligned with the intended query. For each confirmed topic, participants described the issue to the TeleHear AI tool, which identified the concern and returned the appropriate hearing aid settings.

Participants then evaluated the new hearing aid settings while the corresponding sound samples were replayed. They indicated whether the adjustments improved their listening experience. This process was repeated for each identified topic.

At the end of the session, participants completed a survey to assess their overall experience.

Field Trial Procedure

Ten participants were fitted with Starkey Omega AI 24 mRIC R hearing aids, calibrated to NAL-NL2 targets *(Keidser et al., 2011)* using real-ear measurements. Eight participants were experienced hearing aid users. Fine-tuning adjustments were intentionally limited to a minimum—or avoided altogether—to encourage usage of TeleHear AI feature in the field.

Over a 14-day trial period, participants used the hearing aids in their everyday listening environments and tested the TeleHear AI feature. They were instructed to engage with the feature to address any hearing-related concerns or if they had questions about hearing aid functionality. After each interaction, participants completed a brief survey via the My Starkey app to evaluate their experience. At the end of the trial period participants completed an end of a study survey.

Results

Results from both the lab and field studies showed consistently positive user feedback.

In the lab session, a total of 70 evaluations were conducted across participants, comparing TeleHear AI-generated adjustments to their original hearing aid configurations. TeleHear AI-suggested adjustments were rated as improvements over the original hearing aid settings in 87% of these comparisons.

In the field trial, a total of 42 TeleHear AI sessions were completed across 9 users (average ~4 sessions per user). In 29 sessions, participants reported hearing issues that triggered suggested hearing aid adjustments. The remaining sessions involved general queries or commands (e.g., "increase volume"). Figure 3 summarizes the types of issues users reported to TeleHear AI. The most common topics were related to background noise followed by sounds being too loud. The distribution of the reported topics is broadly consistent with those previously reported in HA users *(Jenstad et al 2003)*.

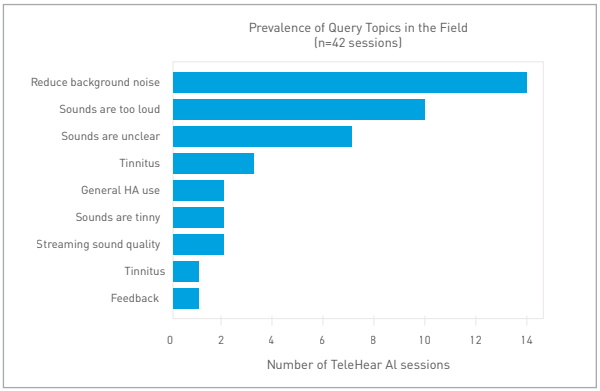

Figure 3: Distribution of the main topics reported to TeleHear AI during the Phase 1 Field Trial.

Feedback was collected for 74% (N=31) of these sessions. Among these, users reported that TeleHear AI correctly identified the issue 87% of the time, and the adjustments led to improved listening experiences in real-world environments 77% of the time *(Figure 4)*.

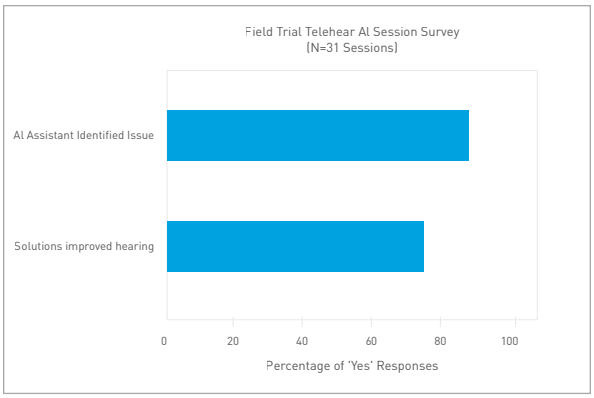

Figure 4: Participant feedback on TeleHear AI sessions during the field trial. After each session, participants completed a survey reporting whether the TeleHear AI assistant accurately identified their issue and whether the suggested hearing aid adjustments or recommendations were helpful. The plot shows the percentage of sessions in which participants affirmed each outcome.

Across both phases of the study, 84% of participants indicated that they found the TeleHear AI feature easy to use and helpful in addressing their hearing concerns indicating a high level of user acceptance and perceived effectiveness *(Figure 5)*. Of note, no participants reported any new or worsening issues related to the TeleHear AI solutions.

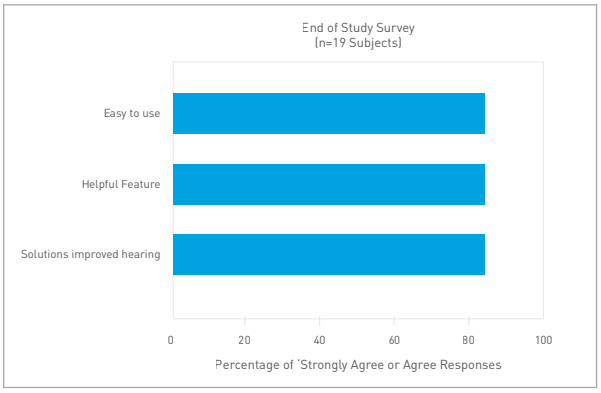

Figure 5: Summary of end-of-study survey results from both lab and field phases. Nineteen participants completed a questionnaire evaluating the ease of use, perceived helpfulness, and effectiveness of the TeleHear AI features. Responses were collected using a Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). For clarity, the chart combines the "Strongly Agree" and "Agree" responses to show the percentage of users who positively affirmed each outcome.

Validation Study Phase II

Participants

Nineteen adults with bilateral hearing loss (mean age = 71 years, 14 male and 5 female), ranging from mild to severe sensorineural hearing loss were recruited into this study. All participants took part in both the lab session and field trial. They were experienced hearing aid users, and underwent audiometric testing and initial hearing aid fittings at the start of the study.

Lab Session Procedure

Nineteen hearing aid users were fitted with Omega AI 24 mRIC R hearing aids that were appropriately fitted and programmed according to their audiometric profiles using the e-STAT 2.0 prescriptive formula.

Participants assessed the feature in the lab prior to any fine-tuning adjustments. They were instructed to use TeleHear AI for any hearing aid issues. If they received a sound setting recommendation, they were prompted to listen to the new setting(s) in the lab and compare to original settings. If they were satisfied, they applied the adjustment.

Field Trial Procedure

After the lab session, all participants continued to use TeleHear AI in the field and were encouraged to use it as much as desired. Over a 14-day trial period, participants wore the hearing aids full-time in their everyday listening environments. Participants filled out a field trial diary each time they used TeleHear AI, providing information as to what prompted them to use it, if their issue was appropriately identified and resolved, and any general comments or concerns.

Results

In the lab session, 11 participants submitted a hearing aid-related question, and 8 participants submitted a sound concern. 94% of participants found the feature to be useful.

During the field trial, a total of 25 TeleHear AI sessions were completed across 11 users (average ~2 sessions per user). Participants submitted a total of 20 general queries that resulted in instructions or answers (e.g. how do I adjust streaming volume) and a total of 5 sessions that resulted in the TeleHear AI feature providing sound setting recommendations for the participant to compare to their current hearing aid settings. Figure 6 summarizes the main topics used with TeleHear AI. When users engaged with TeleHear AI, the feature successfully identified the problem in 92% of the sessions.

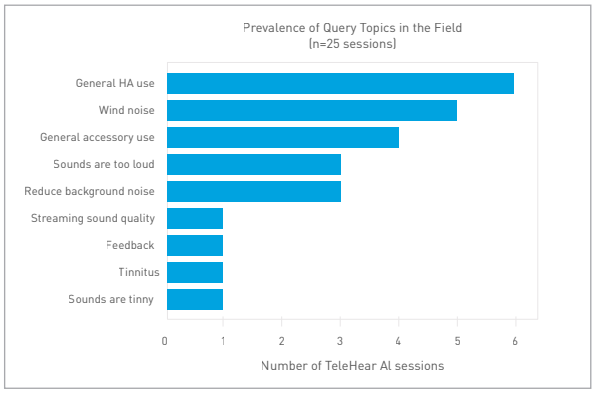

Figure 6: Distribution of the main topics reported to TeleHear AI during the Phase II Field Trial.

Summary

The study results demonstrated that TeleHear AI is an effective tool for HA users to independently manage and resolve common hearing aid issues. By leveraging advanced AI to interpret user questions and deliver real-time adjustments, TeleHear AI potentially reduces the number of follow-up appointments and workload.

Participants reported improved hearing experiences in dynamic, real-world environments that are hard to replicate in clinical settings. These findings underscore TeleHear AI's ability to offer timely, safe, and meaningful solutions that enhance real-world usability and complement professional care.

References

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2. Keidser, G., Dillon, H., Flax, M., Ching, T., & Brewer, S. (2011). The NAL-NL2 prescription procedure. Audiology Research, 1(1)

Author Biographies

Golbarg Mehraei is the Team Lead of the Data Technology Group at Starkey, where she drives the development of data-driven and AI-powered technologies for connected health and clinical decision support. She holds a PhD in Health Sciences and Technology from MIT with focus on computational auditory neuroscience. Before joining Starkey, Golbarg gained valuable experience in data science and machine learning in both bio and health tech companies.

Dean Meyer is a Principal Software Engineer at Starkey Hearing. With extensive experience in developing innovative software solutions, he has played a key role in leading technology initiatives, particularly in the advancement of user-focused features for hearing aid products and services.

Sian Halvorsen , Au.D., CCC-A, joined Starkey in 2023 as a Research Audiologist. She earned her B.S. at the University of North Texas and her Au.D. at the University of Arkansas for Medical Sciences. Her work at Starkey covers product and feature validation of hearing aids and accessories prior to market release, ensuring patient needs are met and clinically relevant outcome measures are used.

Alyssa Neely joined Starkey in 2024 as a Research Audiologist. She earned her B.S. at the University of Wisconsin-River Falls and her Au.D. at the University of Minnesota. Her work at Starkey includes feature and product validation of hearing aids. Her work focuses on bridging the gap between patient experience and product development, ensuring that new solutions are grounded in real-world auditory needs and outcomes.