

Introduction

Due to the COVID-19 pandemic, there has been an uptick in utilizing telepractice in virtually all aspects of healthcare delivery models. The Sacred Heart University Audiology Clinic ceased in-person visits for the majority of 2020 and as a result; turned to utilize and investigate telepractice as a viable delivery model for hearing healthcare. Telepractice has been utilized for years prior to the pandemic; according to Rushbrooke and Houston (2016), "Incorporating telepractice into audiological service delivery improves access to hearing health care and may also enable audiologists and other hearing health care professionals to better serve their clients by providing more flexible service." When effective, teleaudiology provides the opportunity for underserved patients to access audiological services.

In order to validate the effectiveness of audiological services, audiologists use formal self-report outcome assessments, which provide data on hearing aid benefit and satisfaction. This area of aural rehabilitation was the focus of this project; specifically, delivering the Hearing Aid Skills and Knowledge Inventory, or the HASKI (Bennett, et. al. 2017), virtually. The HASKI is a questionnaire that measures hearing aid skills and knowledge across three domains: daily hearing aid use, hearing aid maintenance and repairs, and advanced hearing aid knowledge.

The purpose of the original research study was two-fold: to analyze the effectiveness of remote care provided to adult hearing aid patients and to explore the responsiveness of the HASKI to intervention. After reviewing the preliminary quantitative data, it was evident that the qualitative elements of the HASKI required examination. Therefore, this portion of the research study focuses on the student-clinician perspective including evaluating data trends, considering possible rationales for result trends, and critiquing the HASKI based on collected data. Overall, this study demonstrates that the HASKI may help clinicians target areas of need for patients but can be improved for use in a teleaudiology format.

Objectives

The objective of the research study was to analyze the effectiveness of the HASKI to detect growth in skills and knowledge after providing remote care to adult hearing aid users. The hypotheses were respective of the objectives:

1. The HASKI could be used effectively via teleaudiology.
2. A positive overall change in scores would be detected (e.g., improvement in hearing aid management skills) after virtual intervention.
3. **The change in question-level scores would be impacted by the HASKI's questions, patients' background, and the telehealth format.**

Methods

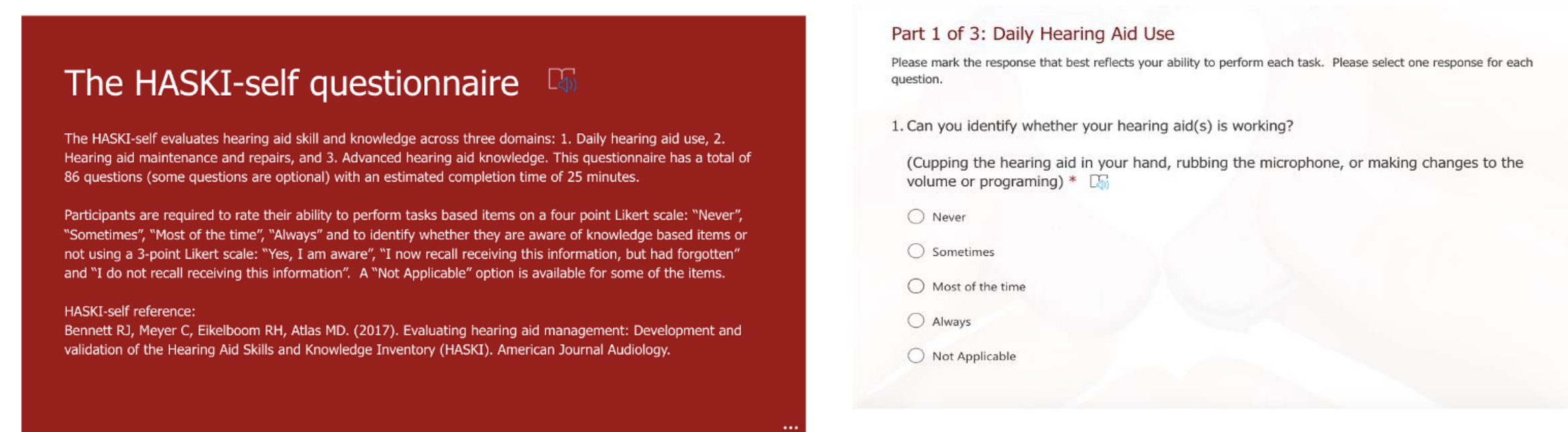
Participants

The initial cohort of participants included sixteen adult binaural hearing-aid users ranging from 47-78 years of age. They were recruited from the Sacred Heart University Audiology Clinic with the following inclusion criteria:

- Participants were required to own and to use hearing devices (no limitations on make, model, or brand).
- Participants must have been wearing hearing aids regularly for at least six months prior to the initial HASKI response.
- Participants were required to have access to stable internet.
- Participants were required to have a device with a camera in order to participate in the tele-aural rehabilitation (AR) session.
- Participants were not restricted by age, educational, or prior treatment limitations in this study.

Methods

Figure 1



The digital HASKI format that was sent to participants both before and after the telehealth session.

Procedure

Initially, the participants were contacted via email or phone to recruit them to participate in the research study; the consenting participants were then sent a HASKI to complete electronically. The HASKI was converted into a computer and mobile friendly form (Figure 1). The results of this survey served as HASKI 1 scores. After completion of the HASKI, the participants were scheduled for a tele-aural rehabilitation session, where each participant met with the audiologist and graduate student clinicians for at least one session that lasted for 60 minutes (Figure 2). Fourteen days following the tele-aural rehabilitation session, the participants received a request to complete the HASKI again. The results of this survey served as HASKI 2 scores.

Figure 2



Graduate students, supervised by Jamie Marotto Au.D., leading a tele-aural rehabilitation session based on HASKI results.

Scoring

Scoring was designed to provide a percentage of competency by calculating a 1 for "always" and 0 for all other responses: "most of the time" "sometimes" and "never." Responses of 'not applicable' were not included. The score was then divided by the number of questions for which a response was given, resulting in a percentage.

Results

Preliminary Data

- The mean for *HASKI 1* scores was 51% (SD=.17) and 67% (SD=.13) for *HASKI 2* scores.
- A Mann-Whitney test indicated that participant's *HASKI 2 scores* (mean= 51) were significantly higher than the initial scores (mean= 67), $U=58.5$, $p=.0156$.
- A Spearman correlation coefficient indicated $r_s = 0.32791$, p (2-tailed) = 0.21502, demonstrating no significant correlation between patient age and percentage of improvement.
- A second Spearman correlation coefficient was run to determine the degree of hearing loss, as indicated by pure tone average (PTA) at 500Hz, 1000Hz and 2000Hz. Results indicated $r_s = -0.32273$, p (2-tailed) = 0.22279; therefore, there was also no relationship observed between the patient's PTA and percentage of improvement.

Discussion

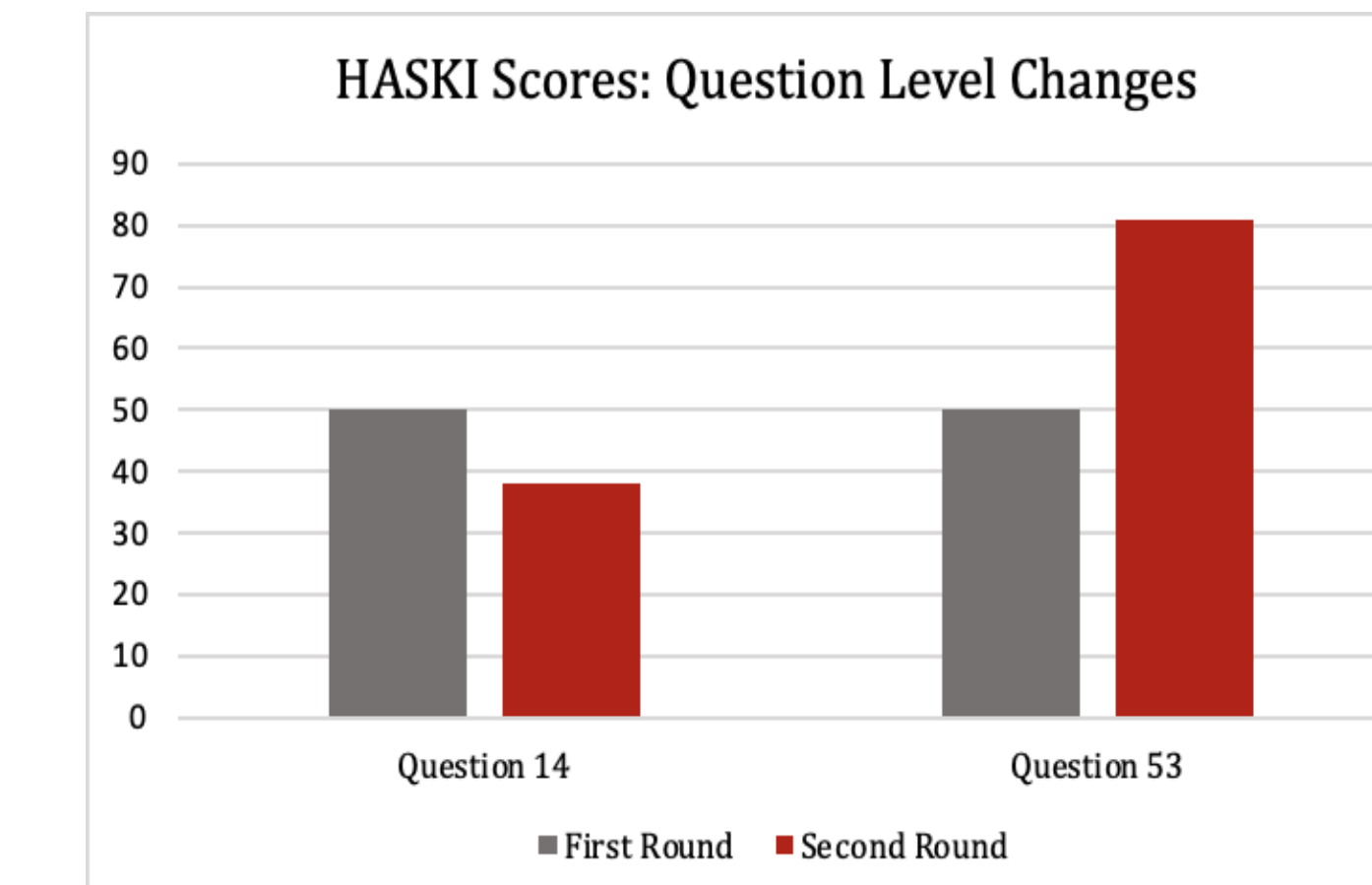
This study served as a useful tool to provide insight into the impact of the efficacy of telehealth. While there were increases in the participant's overall scores, there were varying question level scores. This variable score improvement demonstrates that the change in question-level scores were impacted by the HASKI questions, participants' background, and the telehealth format, rather than the provided tele-aural rehabilitation session. The following trends were observed:

1. Question 53, "Do you know how to change the tubes and domes/molds?" showed an increase. On the *HASKI 1*, participants scored 50% while on the *HASKI 2*, participants' scores increased to 81%. The wording used to describe the hearing aid parts during initial hearing aid fitting session is likely different than the language provided on the HASKI. During the counseling sessions following *HASKI 1*, we identified the tubes, domes, and molds for the participant in a way they immediately recognized. This demonstrates that there is a disconnect between the language provided on the HASKI and language that clinicians use with participants.

2. Question 14, "Can you make adjustments to the volume of your hearing aid(s)?" revealed a decrease. While the participants achieved an overall score of 50% on *HASKI 1*, the score decreased to 38% on *HASKI 2*. This drop is most likely because user experience is variable in terms of making volume adjustments. Some participants actively adjust their settings, while others do not. This demonstrates that when taking the HASKI independently, participants are at a disadvantage because it does not account for differentiated experience with hearing devices.

3. Question 3 (and sub-questions A-D) was removed from all participant scoring. These questions were centered around battery usage, and while most participants wearing rechargeable hearing aids correctly selected "not applicable" to these questions, some of these participants selected "never" on the HASKI 1 score, negatively impacting their overall score. Once again, this demonstrates that there is some variability with independent HASKI interpretation.

Figure 3



Bar graph showing the differences in HASKI question level scores.

Conclusions/Future Directions

Overall, all participants demonstrated improvement in their overall scores on the HASKI following their targeted tele-aural rehabilitation session, indicating the HASKI may be sensitive to use as a tool to detect change. However, there are limitations to the use of the HASKI in a telehealth format, largely because of the variability interpretation of the questions and the unique aspects of individual hearing aid fittings.

Future directions include:

1. Continuation of this project for a larger sample size.
2. Compare responsiveness of the HASKI between in-person and virtual delivery models.