Introduction

Hearing aids are not equally useful to every hearing-impaired patient who is a candidate for amplification. The ability to predict success with amplification in everyday living from measures that can be obtained during an initial evaluation of the patient’s candidacy would result in greater patient satisfaction with hearing aids and more efficient use of clinical resources. This retrospective study investigated the relationships among various demographic and audiometric measures routinely obtained from patients at the Army Audiology and Speech Center, and two measures of hearing aid success. Of the measures considered, the patient’s age was the best predictor of success with amplification.

Method

Subjects

Patients were fit with a variety of hearing aid circuits and models. Most patients were contacted by telephone to obtain the outcome measures. This approach was selected because it provided a means of contacting all patients, regardless of spectacle usage, during a routine telephone interview. The phone interview triggered the mailed letter. Only patients with unaided QuickSIN scores of less than 70 were contacted by mail to obtain a follow-up measure of the QuickSIN. Patients with a unaided QuickSIN score of 70 or greater were assumed to have satisfaction with amplification in everyday living. All clinic patients sign a Privacy Act Statement, acknowledging that their clinical data may be used for research purposes. The assistance of Van Summers and the Audiology Clinic, Army Audiology & Speech Center, Walter Reed Army Medical Center, is acknowledged.

Predictive Measures

The following clinical measures were recorded from each patient’s clinic chart:

- **Patient’s age in years**
- **PTA (0.5, 1.0, 2.0, 4.0 kHz)**
- **Speech-in-Noise Test (QuickSIN)**
- **Speech-in-Noise Test (QuickSIN)**
- **EARL (Audiology Research Lab)**
- **SPIRIT (Sharp, D.C.)
- **Ear and Hearing Aids (HAUS)**
- **RETLA (Roberts et al., 1985)**
- **UPD (Unaided Phonetic Discrimination)**
- **NAI (North American Inventory)**
- **Percentage of correct word recognition in quiet at 80 dB HL in the better ear (%), recorded in quiet at 80 dB HL in the better ear (%)**
- **EXP-L (Lifetime experience with amplification, years)**
- **EXP-C (Experience with current hearing aid, months)**
- **A10 (Age 10)**
- **Mean difference between hearing aids (500-2000 Hz in 10-dB steps, range: 0 to 10 dB)**
- **Mean audiometric in noise**

Presentation

Two measures of hearing aid success were obtained for each patient:

- **International Outcome Inventory for Hearing Aids (IOI-HA)**

The IOI-HA is a self-administered questionnaire to determine an estimate of the usefulness of his/her hearing aid(s) in daily living on a scale from 1-100, where 1 indicates “My hearing aid(s) are of no use to me” and 100 indicates “My hearing aid(s) are of great use to me.” The IOI-HA was selected because it is a simple, straightforward, self-administered questionnaire. It is a reliable and valid measure that can be used to assess satisfaction/benefit. Therefore, a patient’s overall score can vary from 0 to 100.

Finding

None of the standard clinical measures had a strong predictive relationship with either of the outcome measures, suggesting that variables additional to those measured in the study contribute to success with amplification in everyday living. The limited sample size (n = 36) precluded robust examination of clinical variables, especially those associated with high degree of hearing loss such as PTA, NAI, EARL, and both the unaided and aided QuickSIN scores (r = 0.07-0.36, respectively). Despite varied, patient audiologic presentations and their success with amplification, the HAUS scores were not correlated with the HAUS scores.

Discussion

The significant correlations observed between age and both of the outcome measures suggest that age is a significant predictor of success with amplification in everyday living. The correlations between the HAUS and IOI-HA scores are significant for both the unaided and the aided QuickSIN scores (r = 0.54, p < 0.05). A significant correlation between patient age and the unaided QuickSIN is only slightly reduced (r = 0.32, p = 0.01). The significant relationships observed between the HAUS and amplification outcomes appear to be the effects of age.

Table 1. Mean age and standard deviation for each patient

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 (SD: 12)</td>
<td>60</td>
<td>12</td>
</tr>
</tbody>
</table>

The mean age and standard deviation for each patient is 60 years (SD: 12).

Table 2. Correlation between patient age and the QuickSIN scores

<table>
<thead>
<tr>
<th>QuickSIN Score</th>
<th>Patient Age</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unaided</td>
<td>0.54</td>
<td>0.05</td>
</tr>
<tr>
<td>Aided</td>
<td>0.65</td>
<td>0.01</td>
</tr>
</tbody>
</table>

The correlation between patient age and the QuickSIN scores is only slightly reduced (r = 0.32, p = 0.01).

Table 3. Mean scores and standard deviations for each outcome measure

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOI-HA</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>HAUS</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

The mean scores and standard deviations for each outcome measure are 80 (SD: 20).

Table 4. Correlation between the QuickSIN scores and the HAUS scores

<table>
<thead>
<tr>
<th>QuickSIN Score</th>
<th>HAUS Score</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unaided</td>
<td>0.54</td>
<td>0.05</td>
</tr>
<tr>
<td>Aided</td>
<td>0.65</td>
<td>0.01</td>
</tr>
</tbody>
</table>

The correlation between the QuickSIN scores and the HAUS scores is significant (r = 0.54, p < 0.05).

Acknowledgments

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References

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3. Grove Village, IL 60007. www.etymotic.com