Perceived Hearing Aid Benefit in Relation to Perceived Needs

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Abstract

A new scale, the Hearing Aid Needs Assessment (HANA), was developed in order to examine the relationship between perceived communication needs/expectations with the actual benefit eventually achieved with newly fitted hearing aids. A serial sample of 82 patients completed the HANA prior to hearing aid consultation. A subgroup of 42 patients eventually completed the Hearing Aid Performance Inventory after 2 to 3 months of new device use. The results indicated that candidates for amplification expect more benefit than they will typically achieve, especially when listening to speech in noise or without visual cues. For the most part, hearing aid benefit could not be reliably predicted based on perceived need or expectation.

Key Words: Benefit, expectations, handicap, hearing aids

Abbreviations: COSI = Client Oriented Scale of Improvement, HANA = Hearing Aid Needs Assessment, HAPI = Hearing Aid Performance Inventory

Over the past decade, it has become increasingly popular and acceptable to measure the outcome of the hearing aid fitting process using structured patient questionnaires (e.g., Malinoff and Weinstein, 1989; Cox and Gilmore, 1990). These measures have proven to be reliable and otherwise valid reflections of the impact a newly fit hearing aid will have on the daily functioning of the user. Although, on average, hearing aid users tend to rate themselves as receiving a moderate amount of benefit from amplification, there is typically considerable variation from one user to another as to how much benefit is realized. There have been few variables that have been observed to accurately predict this patient-to-patient variation (Schum, 1992).

One potential source of variation that has not been investigated extensively is the patient’s expectations when entering the hearing aid fitting process. A variety of potential scenarios concerning the relationship between expected and obtained benefit exist. For example, it is possible that a patient with very high expectations concerning the new hearing aid may be very difficult to please, thus leading to lower than average perceived benefit. On the other hand, a patient may have high expectations due to a generally positive attitude, and thus also be more likely to report a higher level of benefit. Finally, patients may be legitimately able to rate perceived benefit independently of their expectations entering the process.

An additional factor that may be involved in perceived benefit is the level of need of the patient, as reflected by, for example, how often he/she is in certain communication situations or how much communication difficulty is currently experienced. In other words, if a hearing aid user is not in restaurants or other noisy situations very often, or does not feel that he/she is having much trouble currently, it may not be that important to him/her how effectively the hearing aid performs.

In order to investigate the relationship between expected and perceived benefit, a new scale was developed: the Hearing Aid Needs Assessment (HANA). The HANA was designed as a companion scale to the Hearing Aid Performance Inventory (HAPI) (Walden et al, 1984) and the shortened HAPI (Schum, 1992). The
HANA consists of 11 questions drawn from the HAPI. Prior to the hearing aid fitting process, for each of the 11 situations, the patient is asked to rate how often he/she is in similar situations, how much difficulty he/she currently experiences, and how much benefit is expected from the new hearing aids.

The HANA was administered to an unselected group of patients seeking consultation concerning amplification. A subgroup was followed through the hearing aid fitting and acclimatization process and then administered the HAPI. This design yielded normative data on typical patients' expressed need for and expectations concerning amplification. In addition, comparison of the HANA results with those of the HAPI provided information on the relationship between expectations and results for the hearing aid fitting process.

**METHOD**

**Subjects**

A serial sample of 82 adults (age 18 or older) seeking hearing aid consultation at the University of Iowa Hospital Hearing Aid Laboratory was identified. Patients were excluded from the sample if they demonstrated any cognitive or language-based difficulties that would preclude them from filling out the necessary questionnaires. Both previous hearing aid users and nonusers were included in the sample. Based on local clinical procedure, all subjects had received an audiologic examination at a previous appointment and likely received basic counselling concerning their candidacy for amplification. Thus, all subjects had previously been informed that audiometrically they were candidates for further consultation and voluntarily chose to make and keep the consultation appointment.

Table 1 provides the audiometric and demographic descriptions of the sample. As can be seen, the sample was representative of a typical clinical population of hearing aid patients.

**Hearing Aid Needs Assessment**

The HANA was constructed using 11 items from the HAPI. Walden et al (1984) performed factor analysis on the responses to the 64 items on the HAPI and reported four robust factors. In the construction of the HANA, initially, the three items with the highest factor loadings on subscales 1 (speech in noise), 2 (speech in quiet), and 3 (speech without visual cues) were selected along with the two items with the highest factor loadings on subscale 4 (nonspeech signals). However, in order to arrive at a final set of questions representative of a broad range of listening environments, certain substitutions were performed. The final list of items is presented in Table 2.

For each of the 11 items, the subject was asked to make three ratings:

- How often are you in this type of situation? (hardly ever, occasionally, frequently)
- How much listening trouble do you have in situations like this one? (very little, some, very much)
- How much help do you expect the hearing aid to provide? (very little, some, very much)

If a subject was a current hearing aid user, they were asked to make the difficulty rating assuming use of their current instruments.

At the time of check-in for their consultation appointment, the subject was asked to fill out a paper and pencil version of the test. The reception staff were trained to answer any questions that arose. The specific results of the questionnaire were not discussed with the subjects. Rather, they received advice concerning their candidacy for amplification based on generally accepted clinical procedures.

**Clinical Management**

All subjects were managed either by the author or by one of two clinical fellows under direct supervision of the author. Thus, consistent
Table 2  Hearing Aid Needs Assessment Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Subscale</th>
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</thead>
<tbody>
<tr>
<td>1. You are one of only a few customers inside your bank and are talking with a teller.</td>
<td>Quiet</td>
</tr>
<tr>
<td>2. You are at home reading the paper. Two family members are in another room talking quietly and you want to listen in on their conversation.</td>
<td>No visual cues</td>
</tr>
<tr>
<td>3. You are in a quiet conversation with your family doctor in an examination room.</td>
<td>Quiet</td>
</tr>
<tr>
<td>4. You are driving your car with the windows down and are carrying on a conversation with others riding with you.</td>
<td>Noise</td>
</tr>
<tr>
<td>5. You are home in face-to-face conversation with one member of your family.</td>
<td>Quiet</td>
</tr>
<tr>
<td>6. You are at church listening to a sermon and sitting in the back pew.</td>
<td>No visual cues</td>
</tr>
<tr>
<td>7. You are at a large, noisy party and are engaged in conversation with one other person.</td>
<td>Noise</td>
</tr>
<tr>
<td>8. You are in your backyard gardening. Your neighbor is using a noisy power lawnmower and yells something to you.</td>
<td>Noise</td>
</tr>
<tr>
<td>9. Someone is trying to tell you something in a small quiet room while you have your back turned.</td>
<td>No visual cues</td>
</tr>
<tr>
<td>10. You are starting to cross a busy street and a car horn sounds a warning.</td>
<td>Nonspeech</td>
</tr>
<tr>
<td>11. You are at home alone listening to your stereo system (instrumental music).</td>
<td>Nonspeech</td>
</tr>
</tbody>
</table>

Clinical management decision making was applied.

Of the 82 subjects, 52 opted to pursue hearing aid fitting during the time window of the study. Thirty-four of those fittings were binaural and 18 were monaural. Forty-one of those fittings implemented essentially linear amplification with some type of low distortion output limiting technique (e.g., compression limiting or Class D amplification). The remaining 11 subjects were fit with some sort of advanced technology, such as multichannel compression, TILL amplification, etc. Fitted subjects received follow-up management on at least two occasions using some combination of face-to-face visits, telephone contact, or written contact.

The HAPI was mailed to each subject once it was determined that he/she had achieved a stable level of performance with the new hearing aids. If the patient was 65 years or older, the shortened 38-item HAPI (Schum, 1992) was used. All other subjects were sent the original 64-item HAPI. Consistent with local clinical policy, no further attempts were made to solicit responses from the 10 subjects who did not return the HAPI within the time window of the study. Of the 52 subjects fit during the course of the study, the HAPI was completed by 42 subjects between 2 and 3 months after fitting.

RESULTS AND DISCUSSION

HANA Results

Figures 1 to 3 provide the results of the HANA. All three sets of ratings were scored on a 3-point system, with "hardly ever" or "very little" assigned a 1 and "frequently" or "very much" assigned a 3. Figure 1 shows the mean ratings for frequency of similar situations and Figure 2 shows the mean ratings for severity of listening difficulty. For these two figures, the standard deviations are shown in parentheses. Figure 3 shows the mean ratings for expected hearing aid benefit for both previous and new hearing aid users.

In reference to frequency of similar situations (see Fig. 1), a two-way analysis of variance (ANOVA) (previous experience by subscale) indicated a significant (p < .05) subscale effect but a nonsignificant previous experience effect. Follow-up Tukey comparisons indicated that noisy and nonspeech situations were experienced significantly (p < .05) less often than quiet and nonvisual situations. Given the relatively older mean age of the test sample, it is not surprising...
that noisy situations were rated, on average, as being only “occasional.”

In reference to severity of listening difficulty (see Fig. 2), a two-way ANOVA (previous experience by subscale) indicated a significant (p < .05) subscale effect but a nonsignificant previous experience effect. Follow-up Tukey comparisons indicated that noisy situations and situations with reduced visual cues are, as expected, rated as significantly (p < .05) more difficult than quiet situations or situations with nonspeech stimuli. These results are as expected and generally support the validity of the scale.

In reference to expected hearing aid benefit (see Fig. 3), a two-way ANOVA (previous experience by subscale) indicated a significant (p < .05) subscale effect and significant (p < .05) previous experience effect. In addition, there was a significant interaction. As can be seen, both previous and new hearing aid users expect similar performance in noise, but experienced users expect greater benefit compared to new users on the other three subscales. These results are interesting in two ways.

First, it is clear that experienced hearing aid users, on average, approached the process of updating their existing fittings with the realistic understanding that hearing aids do provide less benefit in more noisy situations. Second, although subjects without previous experience with hearing aids had the most difficulty in noisy situations, they expected that the benefit provided by amplification was not greater in noise than for quieter environments. This finding challenges the popular notion held by many that persons seeking hearing aid consultation for the first time have grossly unrealistic expectations about speech understanding performance in noise.

For all three sets of ratings, it is apparent that the standard deviations are relatively large (approximately 25% of the total scale), indicating significant variation from one subject to the next. Figure 4 provides examples of this subject-to-subject variation.

In Figure 4, the upper curve shows the expectation results from subject LJ. The lower curve provides the expectations of BA. These two subjects had similar audiometric characteristics and neither had used amplification in the past. However, their expectations were clearly different.

HAPI Results

Figure 5 provides the results of the HAPI along with the HANA expectation data for the subgroup of 42 patients. The HAPI yields scores ranging from 1 (“very helpful”) through 5 (“hin-
Predicting Benefit

One of the purposes of this study was to determine if perceived benefit can be predicted by the patient's needs or expectations entering the fitting process. Table 3 provides the correlations between the HAPI and the frequency, severity, and expectation questions from the HANA for each of the subscales. As can be seen, there are only two instances where the HAPI and HANA results are at best moderately correlated:

- HAPI in noise with expectations in noise: \( r = .47 \).
- HAPI in quiet with severity in quiet: \( r = .61 \).

In reference to expectations in noise, those patients with greater expectations in noisy situations tended to perceive greater actual achieved benefit. In reference to difficulty in quiet, those patients with greater perceived difficulty in quiet (presumably those with greater hearing loss, as supported by a positive significant correlation between average hearing loss and perceived difficulty in quiet) achieved greater perceived benefit.

Given that, for the most part, perceived benefit was not strongly correlated with needs or expectations, it appears that prefitting disposition and results operate as separate domains. This finding is consistent with other investigations of perceived hearing aid benefit. For example, Schum (1992) compared HAPI benefit scores with a variety of audiometric and demographic variables. The only variable significantly related to perceived benefit was hours per week of hearing aid use, and that correlation was only \( r = .33 \). This finding should encourage the audiologist in that the ultimate success of a fitting does not appear to be predetermined. Fitting success is

Table 3  Correlations between HAPI Scores and Scores on the Frequency, Severity, and Expectation Questions for Each of the Four Subscales

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Frequency vs HAPI</th>
<th>Severity vs HAPI</th>
<th>Expectations vs HAPI</th>
</tr>
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<tbody>
<tr>
<td>Speech in noise</td>
<td>.26</td>
<td>.13</td>
<td>-.47</td>
</tr>
<tr>
<td>Speech in quiet</td>
<td>.01</td>
<td>-.61</td>
<td>-.19</td>
</tr>
<tr>
<td>Speech without visual cues</td>
<td>.25</td>
<td>-.30</td>
<td>-.02</td>
</tr>
<tr>
<td>Nonspeech stimuli</td>
<td>-.38</td>
<td>-.01</td>
<td>.18</td>
</tr>
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</table>
likely more related to the actual course of the patient management process—factors more within the control of the professional.

DISCUSSION

The results of this investigation should assist the audiologist when counselling patients seeking amplification. On average, patients are likely expecting the new hearing aids to provide more benefit than actually will be achieved. New patients, especially, may not fully appreciate the limitations in noisy environments. The audiologist should be wary of patients whose expectations are clearly above and beyond what a hearing aid can reasonably provide.

The findings of this study should help clinicians when using, for example, the recently developed Client Oriented Scale of Improvement (COSI) (Dillon et al, 1997). In that scale, the patient and audiologist work together at the beginning of the hearing aid fitting process to nominate up to five specific goals of the fitting. After the patient has had the opportunity to adjust to the new devices, the goals are reviewed and the patient rates how well the needs have been met. The COSI has the advantage that the hearing fitting and adjustment process is focused directly on the patient’s individual goals. By being aware that, on average, patient expectations may be high, the audiologist can help ensure that the goals are in fact stated in realistic terms. Further, since actual benefit achieved is difficult to predict a priori, a tool such as the COSI can help shape the course of a rehabilitation process that is not predestined.

CONCLUSIONS

This study provided four interesting results:

1. Potential hearing aid users have needs and expectations that vary in reasonable ways, depending on listening situation.
2. New users had similar expectations in quiet versus noise, whereas previous hearing aid users realized that performance in quiet would likely be better than performance in noise.
3. Overall, expectations were higher than the benefit actually achieved.
4. Actual benefit achieved was difficult to predict based on either needs or expectations at the beginning of the hearing aid fitting process.

REFERENCES


