Objective and Subjective Assessment of Perceived Mild-to-Moderate Hearing Loss

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Introduction

The topic of subjective versus objective means of determining hearing sensitivity has been studied in the past, and wide variability has been seen among the broad population of individuals who have been tested. This topic is more relevant today than ever before because of the Over-the-Counter (OTC) Hearing Aid Act of 2017, also known as H.R. 1652, which was signed into law on August 18, 2017. Under the law, the Food and Drug Administration (FDA) has three years to develop a category for OTC hearing aids. According to the law, OTC hearing aids are for “adults over the age of 18 to compensate for perceived mild-to-moderate hearing impairment.” Any adult who thinks he or she has a mild-to-moderate hearing loss will be able to purchase an OTC hearing aid without receiving a proper audiological evaluation. Individuals may perceive their hearing difficulty as a mild-to-moderate impairment when in fact they may have a greater or lesser degree of hearing impairment.

The OTC Hearing Aid Act of 2017 was based on reports and recommendations from the President’s Council of Advisors on Science and Technology (PCAST) and the National Academies of Sciences, Engineering, and Medicine (NASEM). Both groups have indicated that hearing aids are considered to be high cost with a lack of innovation among manufacturers. Secondly, both groups acknowledge there is a lack of consumer choice when it comes to treatment options for hearing difficulty. The key recommendation made by PCAST were to increase innovation by making a category for OTC hearing aids and increasing consumer choice. The key recommendation made by the NASEM was the establishment of an OTC hearing aid category by the FDA for adults with perceived mild-to-moderate hearing difficulty. When a category for OTC hearing aids is officially established, people believe innovation will increase and costs will decrease. The focus of this study was to determine what is meant by the phrase “perceived mild-to-moderate hearing impairment.”

Numerous studies completed in the past have shown that there is a lack of relationship between hearing threshold data and self-perceived hearing difficulties (Brainerd & Frankel, 1985; Palmer & Solodar, 2009). Overall, these studies suggest people are poor at subjectively quantifying their own degree of hearing impairment. In addition, there is no widely accepted definition or criterion for what “mild-to-moderate hearing impairment” is within the law. The definition of “mild-to-moderate hearing impairment” will likely vary from person to person. The American Speech and Hearing Association (ASHA) states that degree of hearing loss refers to how loud sounds need to be for you to hear them. ASHA classifies a mild loss as indicated in the Over Counter Hearing Aid Act of 2017.

Purpose

The purpose of this study was to examine the relationship between subjective and objective hearing sensitivity in relation to “perceived mild-to-moderate hearing loss” as indicated in the Over-the-Counter Hearing Aid Act of 2017.

Specific Research Questions

1. Can individuals who perceive they may have a hearing loss accurately describe the degree of loss?
2. Can individuals who do not perceive they have a hearing loss accurately describe it?
3. How do individuals define mild-to-moderate hearing loss?

Method

Participants

<table>
<thead>
<tr>
<th>Age Range</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-35</td>
<td>11</td>
</tr>
<tr>
<td>38-73</td>
<td>10</td>
</tr>
</tbody>
</table>
The average age is 52.4.

Inclusion Criteria

(1) No hearing evaluation within the past 12 months
(2) Non-hearing aid user

Procedure

Perceived Hearing Abilities Questionnaire (Pre-Test)

<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Age Range</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otoscopy</td>
<td>11</td>
<td>22-35</td>
<td>26.4</td>
</tr>
<tr>
<td>Tymanometry</td>
<td>10</td>
<td>38-73</td>
<td>51.1</td>
</tr>
<tr>
<td>Air Conduction Testing (250-8000 Hz)</td>
<td>11</td>
<td>22-35</td>
<td>26.4</td>
</tr>
<tr>
<td>Speech Recognition Threshold</td>
<td>10</td>
<td>38-73</td>
<td>51.1</td>
</tr>
<tr>
<td>Word Recognition Testing (NU-6 Lists 1A &amp; 2A)</td>
<td>11</td>
<td>22-35</td>
<td>26.4</td>
</tr>
<tr>
<td>ETYMOTIC Research QuickSIN (Lists 1 &amp; 2)</td>
<td>10</td>
<td>38-73</td>
<td>51.1</td>
</tr>
</tbody>
</table>

Perceived Hearing Abilities Questionnaire (Post-Test)

Counseling of Test Results & Participant Testing Comments

Awareness of OTC Hearing Aid Act (“Yes” or “No”)

Results

Sample Descriptions of Mild-to-Moderate Hearing Loss:

- “Can’t distinguish a few words at normal speaking volumes”
- “Not hearing certain volume or frequency of sounds”
- “Have to have someone repeat themselves”
- “If I cannot hear someone speaking in a crowd. I would say I have mild to moderate hearing loss”
- “Just a little loss in your hearing”
- “Being unable to hear sounds in a certain range; this interferes with daily life”
- “Not being able to hear moderate noises”
- “The perceived loudness to my ears lessening over time”
- “Difficulty hearing conversations when in crowded places”
- “The inability to hear faint or soft noises”
- “Muffled, dimmed, distant sounds”
- “Difficulty hearing in certain settings”

Graph:

<table>
<thead>
<tr>
<th>Hearing Categorization By Group</th>
<th>Normal Hearing</th>
<th>Hearing Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Adult</td>
<td>9</td>
<td>2</td>
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<tr>
<td>Older Adult</td>
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<td>4</td>
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</tbody>
</table>

General Descriptions of Mild-to-Moderate Hearing Loss

- Interference with Daily Life
- Background Noise & Listening Environment
- Sound Quality
- General Cannot Hear
- No Comment

Future Directions

- Include older adults (> 60 years) in order to analyze the objective versus subjective perception of this population.
- Recruit a greater number of participants to better generalize the results to the greater population.
- Utilize more speech-in-noise tests in audiological evaluations to better reflect hearing difficulties.
- When OTC hearing aids become more readily available, how will it impact a person’s decision when it comes to selection of hearing assistive technology?

References