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**Dept:** Communication Sciences and Disorders

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Identification of Elderly People With Hearing Problems

Ina M. Ventry
Barbara E. Weinstein

For older persons generally, no guidelines exist for identifying hearing impairment. Some principles that need to be considered in developing an identification and screening program are discussed here. Authors are the late Ina M. Ventry, professor of audiology and coordinator of audiology programs, and Barbara E. Weinstein, adjunct assistant professor of audiology and coordinator of hearing services and practice, both of Teachers College, Columbia University, New York, New York.

Considerable attention has been given to the early identification of people with hearing impairment but much of this attention has been directed towards infants or children. For example, the American Speech-Language-Hearing Association has a well-established and widely accepted protocol for the hearing screening of school-age children (ASHA, 1975). Early identification of adult workers whose hearing may be affected by industrial noise has also received widespread attention over the years and, just recently, the Occupational Safety and Health Administration promulgated detailed guidelines describing the audiometric requirements of an industrial hearing conservation program (OSHA, 1981). This paper, on the other hand, addresses itself to a large population of people for whom there are no identification guidelines, protocols, or procedures. The people referred to here are the community-based, institutionalized elderly. The purpose of this paper is to discuss principles that need to be considered in developing an identification program for the elderly and to offer some suggestions about screening procedures. Our ultimate goal is to stimulate thought and action among those professionals who are interested in meeting the audiologic needs of older people with hearing problems.

The Need

There appears to be a consensus on the following points. First, elderly people, defined by convention, as individuals aged 65 or over, comprise about 10% of the American population and, more important, the percentage is increasing (Harris, 1978). Second, the prevalence of hearing impairment increases with age. As an illustration, the prevalence of hearing loss in 20-29 year olds is 4% whereas the prevalence of hearing impairment in 70-79 year olds is 70% (Harris, 1978). Third, relatively few elderly people avail themselves of audiologic services and many elderly people who could benefit from amplification do not use hearing aids (Maurer & Rugg, 1979; Freeman & Sinclair, 1981; Dodd & Harford, 1982). Finally, there are no guidelines that describe identification procedures that might be employed in large-scale screening programs of elderly persons.

Screening programs should constitute an important way of initiating hearing care for community-based
elderly. Such screenings can and do take place in a variety of settings—health fairs, retirement communities, senior citizens centers, and the like. While screening for hearing loss in the elderly is probably rather commonplace, specific, well-defined data-based guidelines are not so commonplace. For example, as far as we can determine, there is no consensus on what test frequencies should be employed, what hearing impairment should be used, what test criteria are most effective in limiting false-negative and false-positive identifications, and whether pure-tone screening per se represents the most efficient way to identify people with hearing loss. The remainder of this paper addresses these questions.

A Basic Concept

A fundamental distinction needs to be drawn at the outset between hearing impairment and hearing handicap. This distinction is central to our discussion and is at the heart of our identification procedure. Hearing impairment is "a change for the worse in either structure or function, outside the range of normal" and, as such, is due to any abnormal or functional abnormality that produces hearing loss" (AAO-ACO, 1979: p. 2055). Hearing impairment and hearing loss are synonymous; however, in all of its components, is used to quantify hearing impairment/ hearing loss. Hearing handicap, or the other hand, is defined as "the disadvantage imposed by an impairment sufficient to affect a person's efficiency in the activities of daily living" (AAO-ACO, 1979: p. 2055). This is increasing agreement that handicap is a complex phenomenon that involves far more than hearing impairment and that audiometric data alone cannot be quantified handicap (Noble, 1978; Clark, 1981; ASHA, 1981; Ventry and Weinblatt, 1982). As will be documented below, there is an imperfect relationship between hearing handicap and hearing impairment.

A variety of self-assessment techniques have been developed to measure hearing handicap ranging from the oldest, the Hearing Handicap Scale (HHS), (High, Fairbanks, and Glorig, 1964) to one of the newest, the Hearing Handicap Inventory for The Elderly (HHIE) (Ventry & Weinblatt, 1982). Most of these self-assessment instruments focus on the situational difficulties imposed by a hearing impairment. Scales such as the HHIE and the Denver Scale of Communication Function (Anderj et al., 1973) probe communication and emotional aspects of the hearing impairment. No matter what scale is employed to measure hearing handicap, moderate correlations (about 60) have been reported between hearing impairment (usually defined by the pure-tone average in the better ear) and hearing handicap (Golias, 1982). Squeezing the average correlation of 6 produces an index of Determination of 36%. This means that only 36% of the variability in handicap scores is explained by pure-tone thresholds in the better ear. After additional audiometric measures are factored in the prediction of hearing handicap, the percentage of the explained variance increases to about 40-50%, leaving more than 50% of the variability unexplained (Weinstein & Ventry, 1982). This imperfect relationship between impairment and fluctuating hearing loss or significant psychological or neurological problems were eliminated from the study. All subjects were ambulatory and all lived in the New York City area. Pure-tone thresholds were measured with the procedure recommended by ASHA (1978). The better-ear pure-tone average (500, 1000, and 2000 Hz) for 62 subjects was 37 dBnHL (SD = 1.77 dB). All testing took place in sound-treated test environments meeting ANSI 1977 standards using clinical audiometers calibrated to ANSI 1989 standards.

Although the data are subdivided into the same three categories used earlier, several aspects of these threshold levels are to be highlighted. First, of the people who passed the pure-tone screen (N = 49), 34 (69%) reported no handicap; only one person passed the screen and reported significant handicap. Of the people failing the pure-tone screen, 41 (80%) reported some degree of hearing handicap. Note, too, that of the individuals reporting significant handicap (N = 19), 17 (94%) reported some degree of hearing handicap. It is noteworthy, but not unexpected, that 10 persons failed the pure-tone screen but reported no handicap. Overall, 44% of this sample of older persons reported no handicap and 49% passed the hearing screen.

Table 2

<table>
<thead>
<tr>
<th>Pure-tone fail</th>
<th>Pure-tone screen</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-8</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>10-22</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>41-55 dB</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>96</td>
</tr>
</tbody>
</table>

Table 1

Hearing Handicap Categories

<table>
<thead>
<tr>
<th>Hearing Level</th>
<th>0-8</th>
<th>10-22</th>
<th>24-40</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 dB</td>
<td>35</td>
<td>6</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>26-40 dB</td>
<td>23</td>
<td>22</td>
<td>7</td>
<td>52</td>
</tr>
<tr>
<td>41-55 dB</td>
<td>6</td>
<td>21</td>
<td>21</td>
<td>48</td>
</tr>
<tr>
<td>&gt;60 dB</td>
<td>2</td>
<td>4</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>53</td>
<td>43</td>
<td>162</td>
</tr>
</tbody>
</table>

The fail pass data in Table 2 were obtained by inspecting the individual audiograms of 100 subjects, 62 described earlier and 38 chosen at random from the larger sample of 100 subjects used to evaluate the HHIE. A fail on the pure-tone test was defined as a threshold of at least 45 dB in each ear at 1000 or 2000 Hz. This is analogous to the use of a 40 dB level for screening purposes. That is, a person who fails at 40 dB screen must have a threshold of at least 45 dB at the failed frequency of at least 45 dB. The HHIE-S data are subdivided into the same three categories used earlier. Several aspects of these threshold levels are to be highlighted. First, of the people who passed the pure-tone screen (N = 49), 34 (69%) reported no handicap; only one person passed the screen and reported significant handicap. Of the people failing the pure-tone screen, 41 (80%) reported some degree of hearing handicap. Note, too, that of the individuals reporting significant handicap (N = 19), 17 (94%) reported some degree of hearing handicap. It is noteworthy, but not unexpected, that 10 persons failed the pure-tone screen but reported no handicap. Overall, 44% of this sample of older persons reported no handicap and 49% passed the hearing screen.
elderly. Such screenings can and do take place in a variety of settings—health fairs, retirement communities, senior citizens centers, and the like. While screening for hearing loss in the elderly is probably rather commonplace, specific, well-defined data based guidelines are not so commonplace. For example, as far as we can determine, there is no consensus on what test frequencies should be employed, whether hearing threshold levels should be used, what test criteria are most effective in limiting false-negative and false-positive identifications, and whether pure-tone screening per se represents the most efficient way to identify people with hearing loss. The remainder of this paper addresses these questions.

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A fundamental distinction needs to be drawn at the outset between hearing impairment and hearing handicap. This distinction is central to our discussion and is at the heart of our identification procedure. Hearing impairment is "a change for the worse in either structure or function, outside the range of normal" and is, by definition, an abnormality. Hearing handicap is "a state of disadvantage due to an inability to organize or communicate information, and it is due to any anomaly of or functional abnormality that produces hearing loss" (AAO-ACO, 1979; p. 2055). Hearing impairment and hearing loss are synonymous; an individual who can hear is not said to have any hearing handicap. The key step in the hearing handicap evaluation is to determine which individuals have listening problems (not just hearing loss and not just hearing handicap) must have two components: a pure-tone screen and a hearing handicap assessment. The components of such a program are described below.

Procedure

The data underlying the suggested identification procedures were obtained on 162 subjects, aged 55 years or older. One hundred of these subjects were used to standardize the HHIE and are described in more detail elsewhere (Ventry & Weinblatt, 1982). Sixty-two additional subjects (mean age = 73.3 years) were drawn from essentially the same clinic population used previously (Jupiter, 1982). There was an approximate equal distribution of subjects across 10 age groups.

The data were analyzed below, is an imperfect relationship between hearing handicap and hearing impairment for the patients, and it is not a case of the same individual предприятия. A variety of self-assessment techniques have been developed to measure hearing handicap ranging from the oldest, the Hearing Handicap Scale (HHS: High, Fairbanks, and Glorig, 1964) to one of the newest, the Hearing Handicap Inventory for The Elderly (HHIE) (Ventry & Weinblatt, 1982). Most of these instruments focus on the situational difficulties imposed by a hearing impairment. Scales such as the HHIE and the Denver Scale of Communication Function (Alpern et al., 1975) probe communication and emotional aspects of the hearing handicap. No matter what scale is employed to measure hearing handicap, at least moderate correlations (about 0.60) have been reported between hearing handicap impairment (usually defined by the pure-tone average in the better ear) and hearing handicap (Giolas, 1982).

Squaring the average correlation of 0.60 produces an index of determination of 36%. This means that only 36% of the variability in handicap scores is explained by pure-tone thresholds in the better ear. After the addition of audiometric measures are available, the prediction of hearing handicap, the percentage of the explained variance increases to about 40-50%, leaving more than 50% of the variability unexplained (Weinstein & Ventry, 1982).

The imperfect relationship between impairment and fluctuating hearing loss or significant psychosocial or neurological problems were eliminated from the study. All subjects were ambulatory and all lived in the New York City area. Pure-tone thresholds were measured with the pure-tone average hearing levels measured with the procedure recommended by ASHA (1978). The better-ear pure-tone average (500, 1000, and 2000 Hz) for the 62 subjects was 37 dBJL (50-177 dBJL). All testing took place in sound-treated test environments meeting ANSI 1977 standards using clinical audiometers calibrated to ANSI 1969 standards.

The data were developed to screen for self-assessed hearing handicap. The reason the HHIE was selected for use is that it is the only handicap assessment instrument designed for and standardized on elderly people. The 26-item clinical version was reduced to a 10-item screening tool that included five social/situational items and five emotional items. The items were selected in such a way as to ensure that the short form was comparable to the complete form. The internal consistency (Chronbach's alpha) of the screening version is 0.77, significantly above the 0.30 required. Scores on the HHIE-5 (screening) can range from 0 to 40; a YES response is given 4 points, a NO response, zero points, and a SOMETIMES response, 2 points. For screening purposes, HHIE scores were divided into three categories: 0-6 (no self-perceived handicap), 10-22 (mild to moderate handicap), and 24-40 (significant handicap). The advantage of this scheme will be described below.

The Data Base

Table 1 shows the relationship between the three categories of hearing handicap and pure-tone average hearing handicap. The reason for this table is that it emphasizes the point made earlier that pure-tone data cannot be used to estimate or predict the hearing handicap. There is an obvious relation between pure-tone average hearing sensitivity and hearing handicap: 83% of the subjects with no hearing handicap report no pure-tone average hearing handicap; 70% of the subjects with mild (less than 55 dB PTA) report significant hearing handicap. However, six subjects with significant hearing loss report either no handicap (two) or a mild handicap (four) while seven subjects report either mild (six) or significant (one) handicap. What is especially noteworthy is that the 52 subjects with 26-40 dB pure-tone averages are nearly equally divided between those who report no handicap (44%) and those who report mild or significant handicap (56%). This finding underscores the point made earlier that no matter what hearing levels are chosen for screening, they are destined to overidentify or underidentify with hearing problems. It also illustrates the variability in self-assessed handicap in individuals with mild hearing impairment.

Another important point emerges from the data shown in Table 1. By omitting consideration of the mild (10-22) handicap category, it becomes rather clear that significant hearing handicap in the elderly often begins when the pure-tone average in the better ear exceeds 40 dB. Note the striking difference in the proportion of subjects who identified themselves as significantly handicapped and those identified as no handicap to the 26-40 dB pure-tone average level categories. In the former category, more than three-quarters of the subjects (23/30) report no handicap while in the latter category, more than three-quarters of the subjects (21/27) report significant handicap. As would be expected, when the data are viewed in this dichotomous fashion, minimal hearing impairment produces minimal handicap while moderate hearing loss results in significant self-assessed hearing handicap.

Screening Levels

The data shown in Table 1, however, are not directly applicable to the issue of screening levels to be employed in identification program. The first reason for this is that the true relationship between hearing handicap and pure-tone average hearing levels chosen. The frequencies tested, and the pass/fail criteria employed. It is possible for a person to have a pure-tone average within normal limits and yet fail the screening. (It is not possible for an individual to have a significantly elevated pure-tone average in the better ear and pass a screening test.) On the other hand, as shown in Table 1, the data presented in Table 1 suggest that a 40 dB average for the speech frequencies is a critical level and these data, with a careful inspection of our results, lead us to propose that screening levels be set at 40 dBHL at 1000 Hz.

Table 1

<table>
<thead>
<tr>
<th>Hearing Level</th>
<th>Hearing Handicap Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25 dB</td>
<td>0-6</td>
</tr>
<tr>
<td>26-40 dB</td>
<td>10-22</td>
</tr>
<tr>
<td>41-60 dB</td>
<td>24-40</td>
</tr>
<tr>
<td>&gt;60 dB</td>
<td>40</td>
</tr>
<tr>
<td>TOTALS</td>
<td>66</td>
</tr>
</tbody>
</table>

The fail pass data in Table 2 were obtained by inspecting the individual audiograms of 100 subjects, 62 described earlier and 38 chosen at random from the larger sample of 100 subjects used to evaluate the HHIE. A fail on the pure-tone test was defined as a threshold of at least 45 dB in each ear at 1000 or 2000 Hz. This is analogous to the use of a 40 dB level for screening purposes. That is, a person with a fail on 40 dB screening must have a threshold of at least 45 dB at the failed frequency of at least 45 dB. The HHIE-5 data are subdivided into the same three categories used earlier. Several aspects of these hearing levels need to be highlighted.

First, of the people who passed the pure-tone screen (N = 49), 34 (69%) reported no handicap, only one person passed the screen and reported significant handicap. Of the people failing the pure-tone screen, 41 (80%) reported some degree of hearing handicap. Note, too, that of the individuals reporting significant handicap (N = 19), 11 (58%) had a pure-tone screen also, but not expected, that 10 persons failed the pure-tone screen but reported no handicap. Overall, 44% of this sample of older persons reported no handicap and 49% passed the hearing screen.

Table 2

| Pure-tone Pass/fail data as a function of hearing handicap categories. Failure is defined as inability to hear a 40 dB level in one or both ears. The numbers in parentheses represent the change in results when 500 Hz is included as a test frequency. N = 100.
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>Hearing Handicap Categories</td>
<td>Pure-tone Screen</td>
</tr>
<tr>
<td>Fall</td>
<td>Pass</td>
</tr>
<tr>
<td>0-6</td>
<td>10</td>
</tr>
<tr>
<td>10-22</td>
<td>24</td>
</tr>
<tr>
<td>24-40</td>
<td>12</td>
</tr>
<tr>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>TOTALS</td>
<td>51</td>
</tr>
</tbody>
</table>

*The comparable categories for the full inventory are 0-6 (no handicap), 10-22 (mild to moderate handicap), and 44 (moderate handicap) (Weinstein & Ventry, 1982).
Although we were impressed with these findings, we explored other pass/fail criteria, other screening levels, and different frequency combinations. Pure-tone screening also modified efficacy as effective that which produced the results in Table 2. For example, lowering the screening levels produced a large increase in the pure-tone fail rate. As a result, more people failed the screen and reported no handicap than the 15% shown in Table 2. Including 500 Hz produced a minimal change in the pass/fail distribution and only in the 10-22 handicap group (see Table 2). When pure-tone screening produced a dramatic increase in the pure-tone fail rate from the 51% rate shown in Table 2 to 74%. Using 2000 Hz alone produced results that were identical to the results shown in Table 2 for 1000 and 2000 Hz. The implication of these findings will be discussed below. The basic problem associated with any manipulation of audiometric parameters is the potential distortion of this article, namely, the imperfect relationship between hearing sensitivity and hearing handicap. We suggest that the data shown in Table 2 are probably as close as one will get to producing a meaningful and efficient relationship, for screening purposes, between handicap and pure-tone screen data.

A Priority System

An important consideration in any screening program relates to the number of people who fail the unconditional test and are referred for further evaluation and/or intervention. A large number of referrals, especially including people who do not need follow-up care (i.e., false positives), overburdens the referral network, causes unnecessary expense, and may alienate community agencies. The priority system described here is designed to insure that people who probably need services receive them.

The priority system is as follows:

Priority One: Significant handicap (24-40) and fails pure-tone screen. This group represented 17% of the sample.

Priority Two: Significant handicap and passes pure-tone screen (1%).

Priority Three: Mild handicap (10-22) and fails pure-tone screen (24%).

Priority Four: No handicap (0-8) and fails pure-tone screen (10%).

Both tests frequencies in one ear combined with a pass for both frequencies in the other ear. All nine persons who originally passed the pure-tone screen would now fail while only two additional subjects out of the 100 subjects would be identified as "unilateral" when, in fact, they did not have an unilateral hearing loss. The referral priority given to these "unilateral" needs to be decided by each screening agency although we would place them in the Priority One Category.

Choice of Test Frequencies. It is recommended that 1000 and 2000 Hz be used as the test frequencies. The inclusion of 4000 Hz produces an unacceptable high fail rate and, in addition, will fail nearly 60% of those who report no handicap. If one wishes, 500 Hz can be included along with 1000 and 2000 Hz but it must be recognized that two frequencies provide essentially the same results.

Table 3 refers to the three-frequency combination (Table 2). Further, the two-frequency screen is faster and is less subject to the masking effects of ambient noise. Finally, 2000 Hz could be used as the basis for the results identical to those obtained with the two-frequency screen. The professional community, however, may find it difficult to accept a single-frequency test. We feel that the use of a single frequency would be an act of conclusion and controversy that surrounded the use of one- and two-frequency screening of school children in the late 1950s and early 1960s. To recapitulate, the group has decided to use 4000 Hz, 1000 Hz and 2000 Hz and the administration of the HHIE-S. A "fail" on the pure-tone screen is the inability to respond at any frequency in one or both ears. The "unilateral" criterion is the failure to respond to both frequencies in one ear combined with a pass at both frequencies in the other ear. Referral guidelines based on the pure-tone screen results and scores on the HHIE-S.

Some Screening Data: As noted earlier, the screening program was based on audiotmetric data from elderly subjects referred to a hospital speech and hearing clinic for follow-up evaluation. In all, the pass-fail distributions shown in Table 2 were not obtained from a single screening program but from an impression of audiograms. The data shown in Table 3, however, were obtained from community-based elderly subjects who responded to announcements regarding the availability of referral priority system associated with the protocol.

Conclusions

The hearing health needs of elderly Americans have not received the attention given to other segments of the population. Although there are several reasons for this, one likely reason is the lack of a meaningful, cohesive, organized identification program that can be used to initiate and implement a total rehabilitation program. To date, few guidelines exist to help shape and direct efforts at large scale screening of elderly people. The proposal presented in this paper is designed to use pure-tone screening combined with a full-frequency audiometric assessment as the mainstays of an identification program to quickly and accurately identify people who require audiological intervention. This concept of screening appears to be a feasible approach that takes into account not only the needs of the elderly but the community resources available to provide follow-up services. Although there are still some unresolved issues with respect to the identification program outlined here (e.g., personnel, settings in which to perform testing, and so forth), the proposal should encourage concerned professionals to initiate identification programs and to think creatively about ways of implementing such programs. One caveat: problem identification is not the same as problem solution. No matter how sophisticated the identification program, it is destined to fail if those identified as having a problem do not receive the professional assistance they require and deserve. While identification is important indeed, it is only the first step in meeting the audiological needs of the hearing-impaired elderly.

References

Occupational Safety and Health Administration. Occupational Safety and Health Administration hearing conservation amendment. Federal Register, 1981, 46, 4662-4628.
Although we were impressed with these findings, we explored other pass/fail criteria, other screening levels, and different frequency combinations. Force normalization was as effective as that which produced the results in Table 2. For example, lowering the screening levels produced a large increase in the pure-tone fail rate. As a result, more people failed the screen and reported no handicap than the 19% shown in Table 2. Including 500 Hz produced a minimal change in the pass/fail distribution and only in the 10-22 handicap category (see Table 2). Excluding 500 Hz produced a dramatic increase in the pure-tone fail rate from the 51% rate shown in Table 2 to 74%. Using 2000 Hz alone produced results that were identical to the results shown in Table 2 for 1000 and 2000 Hz. The implication of these findings will be discussed below. The basic problem associated with any manipulation of audiometric parameters is the potential for misinterpretation of the data; namely, the imperfect relationship between hearing sensitivity and hearing handicap. We suggest the data shown in Table 2 are probably as close as one will get to producing a meaningful and efficient relationship, for screening purposes, between handicap and pure-tone screen data.

A Priority System

An important consideration in any screening program relates to the number of people who fail the screen and are referred for further evaluation and/or intervention. A large number of referrals, especially including people who do not need follow-up care (i.e., false positives), overburdens the referral network, causes unnecessary expense, and may alienate community agencies. The priority system described here is designed to ensure that people who probably need services receive them.

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Priority Two: Significant handicap and passes pure-tone screen (1%).

Priority Three: Mild handicap (10-22) and fails pure-tone screen (24%).

Priority Four: Mild handicap (10-22) and passes pure-tone screen (14%).

Priority Five: No handicap (0-8) and fails pure-tone screen (10%).

The major advantage of this system is that rather than referring all people who fail a pure-tone screen or who report some degree of hearing handicap, it quickly identifies those elderly who are in need of assistance and focuses attention on them. It should be noted that we have some preliminary data suggesting that a number of people who report mild handicap and fail the pure-tone screen (priority three) do, indeed, require audiologic follow-up. It appears, then, that elderly people who fail into the first three categories deserve essentially the same attention. Thus, 42% of the clinic sample would be referred while 34% of the community sample (see below and Table 4) would be referred for further audiologic evaluation of their rehabilitative needs.

Table 3

<table>
<thead>
<tr>
<th>Hearing Handicap Category</th>
<th>Pure-tone Screen</th>
<th>Fall</th>
<th>Pass</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-8</td>
<td>12</td>
<td>40</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>10-22</td>
<td>27</td>
<td>17</td>
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<td>24-40</td>
<td>4</td>
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<td></td>
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<tr>
<td>44-80</td>
<td>43</td>
<td>61</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>

Some Special Considerations

Unilateral Hearing Loss. Sixteen persons in our sample had an unilateral (N = 8) or a bilateral (N = 8) asymmetrical hearing impairment. Although four subjects in this latter group fell into the Priority One category, eight of the nine unilateralists did not pass the pure-tone screen while also reported no handicap. The remaining subject with a unilateral loss did report some handicap and would have been placed in the Priority Four Category. Since a unilateral loss may be a symptom of significant ear disease or represent a treatable ear condition, it appeared desirable to modify the fail criteria to reflect the importance of unilateral hearing impairment. To this end, a "unilateral fail" criterion is defined as an inability to hear a tone at the three-frequency combination (Table 2). Further, the two-frequency screen is faster and is less subject to the masking effects of ambient noise. Finally, 2000 Hz could be used and would result in those subjects already comprehended with the two-frequency screen. The professional community, however, may find it difficult to accept a single-frequency screening protocol. The group, therefore, is subdivided into subjects failing only the single-frequency screening or of school children in the late 1950s and early 1960s.) To recapitulate, the pure-tone screen protocol calls for testing at 40 db HL at 1000 and 2000 Hz and the administration of the HHIE-S. A "fail" on the pure-tone screen is the inability to respond at any preselected level in each ear. The "unilateral" criterion is the ability to respond to both frequencies in one ear combined with a pass at both frequencies in the other ear. Referral criteria based on the pure-tone screen results and scores on the HHIE-S.

Some Screening Data: As noted earlier, the screening protocol was based on audiometric data from elderly subjects referred to a hospital speech and hearing clinic for evaluation. In other words, the pass/fail distributions shown in Table 2 were not obtained from an actual screening program but from an imposition of audiograms. The data shown in Table 3, however, were obtained from 104 community-based elderly subjects who responded to announcements regarding the availability of referral priority system associated with the protocol.

Conclusions

The hearing health needs of elderly Americans have not received the attention given to other segments of the population. Although there have been signs for this, one likely reason is the lack of a meaningful, cohesive, organized identification program that can be used to initiate and implement a total rehabilitation program. To date, few guidelines have been developed to shape and direct efforts at large scale screening of elderly people. The proposal presented in this paper is designed to use pure-tone screening as the mainstay of an identification program to quickly and accurately identify people who require audiologic intervention. This combination appears to be a feasible approach that takes into account not only the needs of the elderly but the community resources available to provide follow-up services. Although there are still some unresolved issues with respect to the identification program outlined here (e.g., personnel, settings in which to perform testing, and so forth), the proposal should encourage concerned professionals to initiate identification programs and to think creatively about ways of implementing such programs. One caveat: problem identification is not the same as problem solution. No matter how sophisticated the identification program, it is destined to fail if those identified as having a problem do not receive the professional assistance they require and deserve. While identification is important indeed, it is only the first step in meeting the audologic needs of the hearing-impaired elderly.

References


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