Hearing aid compliance in the elderly

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Key-words. Hearing aid; compliance; elderly; questionnaire

Abstract. Hearing aid compliance in the elderly. Objectives: A decreasing but still substantial proportion of elderly persons with hearing aids use them only occasionally. Because the prevalence of age-related hearing loss is increasing, it is important for the hearing rehabilitation process to be effective. The aim of this study was to use a mailed questionnaire to evaluate the rate of hearing aid use and the reasons for minimal use or nonuse.

Methods: Questions about hearing aid use and associated problems were included in a survey of hearing mailed to 4,067 people in age cohorts of 70, 75, 80 and 85 years in an industrialized urban community in Finland.

Results: In this sample of 249 hearing aid users, 55.4% used their hearing aid daily, and 27.3% used it >6 hours a day. The percentage of subjects who never used their hearing aid was 10.7%. Use of hearing aids tended to decline with advancing age. The most common reasons for minimal use were disturbing background noise, acoustic feedback problems, battery cost, and a lack of motivation to use the hearing aid.

Conclusions: Compliance with hearing aid use by the elderly is increasing, but a significant proportion of hearing aids are still used only occasionally or never. We discuss methods to improve compliance in this patient group. Our results may be used to reexamine existing procedures for fitting hearing aids for counseling, which may increase patient compliance with hearing aids, leading to greater benefits from their use.

Introduction

Hearing aids have a remarkable effect on the hearing-related quality of life and communication skills of elderly people. Mulrow et al.¹ reported improvements in social and emotional functioning, communication, cognitive ability, and even depression in a study in which patients who received hearing aids were compared to those who were assigned to a waiting list. In this study, the average self-reported hearing aid use was 8 hours a day. In a 1 year follow-up,² these quality-of-life dimensions were still improved, except for cognitive ability, which had reverted to baseline. The effect of hearing aid use on cognitive ability was not confirmed in a study by van Hooren et al.³ Parving and Philip used a questionnaire to study hearing aid use and its benefits in patients >90 years of age.⁴ Even in this age group, the benefit was clear. Half of the respondents used a hearing aid every day, and 64% were satisfied with the aid. Problems handling the device were common, particularly in first-time users group.

Schneider et al.⁵ reported an increase in the need for community support of hearing-impaired persons, particularly if the hearing-impaired subject did not use a hearing aid.⁵

In an analytical review of studies of hearing aid uptake and satisfaction, Knudsen et al.⁶ stated that a positive attitude towards rehabilitation and acceptance of hearing loss were favorable factors. Age and gender did not have an effect on use and satisfaction; neither did educational level nor living arrangements (alone or with others). However, impaired dexterity appeared to reduce the daily use of a hearing aid.

Technical advances in hearing aid technology are improving hearing aid compliance. Vuorialho et al.⁷ described a marked improvement in hearing aid use in their interview study, compared to a study that took place 20 years previously and used the same methods.⁸ The percentage of regular users increased from 40.9% to 56.6%; more importantly, the proportion of nonusers diminished from 33.3% to 5.3%.

This study was financially supported by the Hospital District of Southwest Finland.
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The proportion of elderly people is increasing in developed countries. Eurostat predicts that between 2008 and 2060, the share of people aged 65 years or over in the total population of the EU will increase from 17.1% to 30.0%, and the number will rise from 84.6 million to 151.5 million. In their study of hearing impairment in Finland, Uimonen et al. reported the prevalence of measured hearing loss to be at least 10.0% at 65 years of age; the prevalence was 32.5% at 75 years. In a Swedish study using the self-reporting method, the prevalence of hearing loss was estimated to be 23% in the 65-74 year age group and 30% in the 75-84 year age group. Thus, it is clear that there is an increasing need for hearing rehabilitation, and the costs are substantial. Mäkitorkko et al. estimated the annual expenditure on hearing services to be 9.61 euros per capita in Denmark. Therefore, it is important to know which patients benefit from hearing aids and what the common pitfalls are in fitting hearing aids successfully.

We wanted to improve the effectiveness and quality of hearing aid fitting in our hospital district. The objective of this study was to evaluate hearing aid use and nonuse on a population level, and to identify aspects that favor or hinder the use of hearing aids.

Materials and methods

The present study is part of a project that is investigating hearing impairment and rehabilitation in the elderly. The subjects were Finnish-speaking home-dwelling elderly persons in Turku, an industrialized urban community of 175,000 inhabitants in the southwestern part of Finland. The subjects formed four age cohorts born in the years 1917, 1922, 1927, and 1932 (approximate ages 70, 75, 80, and 85 years, respectively). The data for this sample were retrieved from a database of the Finnish Population Register Centre. The subjects were sent a questionnaire, and the hearing aid users were asked to fill in a form with questions regarding the extent of hearing aid use, the type of hearing aid, the patients’ experience with using it, and the reasons for possible lack of use. Altogether, 2,717 subjects of the population of 4,067 (66.7%) responded either to the mailed questionnaire or to a telephone interview. The subjects who responded to the questionnaire had a gender distribution similar to the same age cohorts in the general population (64.4% and 65.5% were female, respectively; \( p = 0.33 \)). People in the oldest age group were less likely to respond than those in the younger age groups (67.7%, 65.3%, 61.3%, and 49.2% responded at the age of 70, 75, 80, and 85 years, respectively; \( p = 0.002 \)). Altogether, 249 subjects responded to the questions for hearing aid users; this was 9.2% of those who responded to the hearing questionnaire. Because the prevalence of hearing aid owners in the population was unknown, the response rate could not be directly estimated. In a population in Kuopio in Finland, the prevalence of hearing aids was 16.6% in an age group of 75 years and older.

In Turku, hearing aids are mostly fitted in two public health service departments: the university hospital and the health care center in the town. A small minority of hearing aids are provided by three private hearing rehabilitation units. Hearing aids are provided free of charge by the public health service departments, and the majority of hearing aid fittings in private units are paid for by insurance companies (e.g., for professional noise-induced hearing loss). The battery costs are paid for by the patient, except in cases in which they are refunded by insurance. At the time of the present study, binaural hearing aid fitting was not routinely offered for the elderly. Only nine subjects had binaural fitting (3.5%).

Statistical analyses were performed with SAS version 8.2 software (SAS Institute Inc., Cary, NC, USA). Statistical comparisons were done with the chi-square test or Fisher’s exact test. \( p \) values of <0.05 were considered statistically significant.

The study plan was approved by the Medical Ethics Committee of the Hospital District of Southwest Finland. The participants provided written informed consent for the study.

Results

The amount of hearing aid use by the subjects is presented in Table 1. Use of hearing aids tended to decline with advancing age (Table 2), but the difference was not statistically significant. Although 60% of the subjects in the 70 year age group used their hearing aid daily, only two-fifths of the oldest age group did so. The difference was significant \( (p = 0.005) \) in women; two-thirds of the subjects used the hearing aid daily in the 70 year age group, but only one-third did so at the age of 85 years. Furthermore, among women, over half of the hearing...
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Poor compliance was the disturbing effect of background noise, which occurred in 64.9% of cases. However, subjects who used a hearing aid daily had a tendency to complain more often of disturbing background noise (73.7%). The effect of background noise was complained of by ten of the 14 subjects (71%) in the youngest age group with poor compliance, while only half of those in the oldest age group. The amount of use of behind-the-ear (BTE) and in-the-ear (ITE) hearing aids did not differ significantly; hearing aids were used daily by 59.5% and 49.3% of the people in the BTE and ITE groups, respectively ($p = 0.285$).

Reasons for the minimal use of hearing aids are presented in Table 3. The most common reason for poor compliance was the disturbing effect of background noise, which occurred in 64.9% of cases. However, subjects who used a hearing aid daily had a tendency to complain more often of disturbing background noise (73.7%). The effect of background noise was complained of by ten of the 14 subjects (71%) in the youngest age group with poor compliance, while only half of those in the

### Table 1

<table>
<thead>
<tr>
<th>Age group</th>
<th>Daily N (%)</th>
<th>More than 3 days a week N (%)</th>
<th>Seldom or never, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>25 (59.5)</td>
<td>3 (7.1)</td>
<td>14 (33.3)</td>
</tr>
<tr>
<td>75</td>
<td>45 (64.3)</td>
<td>7 (10.0)</td>
<td>18 (25.7)</td>
</tr>
<tr>
<td>80</td>
<td>48 (57.8)</td>
<td>15 (18.1)</td>
<td>20 (24.1)</td>
</tr>
<tr>
<td>85</td>
<td>22 (40.7)</td>
<td>7 (13.0)</td>
<td>25 (46.3)</td>
</tr>
</tbody>
</table>

### Table 2

Use of hearing aids in different age groups of subjects who own a hearing aid ($p = 0.050$, chi-square test)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Daily N (%)</th>
<th>More than 3 days a week N (%)</th>
<th>Seldom or never, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Every day &lt; 6 hours</td>
<td>69</td>
<td>27.7</td>
</tr>
<tr>
<td></td>
<td>Every day &gt; 6 hours</td>
<td>71</td>
<td>28.5</td>
</tr>
<tr>
<td></td>
<td>More than three days weekly</td>
<td>32</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Seldom</td>
<td>50</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>27</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>249</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 3

Comparison of problems experienced by elderly hearing aid users in Finland who use hearing aids seldom or never ($N = 74$) or every day ($N = 57$).

<table>
<thead>
<tr>
<th>Problems</th>
<th>Amount of hearing aid use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seldom or never</td>
</tr>
<tr>
<td>Background noise is disturbing.</td>
<td>48</td>
</tr>
<tr>
<td>Ear mold feels uncomfortable.</td>
<td>7</td>
</tr>
<tr>
<td>Hearing aid has feedback problems.</td>
<td>16</td>
</tr>
<tr>
<td>I am not capable of using the hearing aid.</td>
<td>11</td>
</tr>
<tr>
<td>Difficulties in putting the aid in the ear.</td>
<td>17</td>
</tr>
<tr>
<td>Batteries are too expensive.</td>
<td>10</td>
</tr>
<tr>
<td>I am so lonely that I do not need a hearing aid.</td>
<td>13</td>
</tr>
<tr>
<td>Fear of other people paying attention to the aid.</td>
<td>1</td>
</tr>
<tr>
<td>Relatives wanted me to wear the hearing aid.</td>
<td>15</td>
</tr>
<tr>
<td>My hearing is so good that I do not need a hearing aid.</td>
<td>6</td>
</tr>
</tbody>
</table>
oldest age group who were poorly compliant (12 of 25) found it disturbing; this difference was, however, not significant (p = 0.12). Approximately one-fifth of respondents had problems getting the hearing aid into the ear; no difference was found between the BTE and ITE hearing aid types (p = 1.00). Disturbing feedback was also a reason for minimal hearing aid use in approximately one-fifth of this group, and it was equally complained about by users of BTE and ITE hearing aids (p = 0.41).

Approximately one-fifth of the patients with poor compliance stated that the reason they underwent a fitting for a hearing aid was because their relatives had asked them to do so. This was more common in the older age groups (7.1%, 22.2%, 21.1%, and 24.0%, in the age groups from 70 to 85 years, respectively), but the difference was not significant (p = 0.62). Just as often, poorly compliant respondents felt less need for a hearing aid because he or she was often alone. About 15% felt that the ear mold was uncomfortable; there was no significant difference in this aspect between BTE and ITE hearing aids (p = 0.17). About one out of every seven patients complained that they were not capable of using the hearing aid; these poor skills were not significantly different among the age groups (p = 0.20). Problems with using the hearing aid were reported by nine out of 52 women and two out of 24 men, but the difference between the sexes was not significant (p = 0.30). These problems were not associated with the type of hearing aid (BTE or ITE; p = 0.68). Only one of the subjects with poor hearing aid compliance complained about a fear that others might notice the hearing aid.

The questionnaire also contained an open-ended question about problems with hearing aid use. Altogether, 45 subjects gave additional reasons for minimal hearing aid use. They complained mostly about the same topics as in the closed-set questions; e.g., aversion to background noise, the lack of a need for a hearing aid, and an uncomfortable ear mold or hearing aid. Two of the respondents complained of a disturbing itching in their ears, two felt that their tinnitus increased with a hearing aid, and two complained of autophonia. Two respondents had lost their hearing aids, and two of the hearing aids were broken.

The majority of hearing aids were fitted in the university hospital (61.1%); the health care center and private units respectively provided 15.3% and 13.9% of the hearing aids. Seven respondents (9.7%) did not provide or could not remember the source of their hearing aids. The unit that fitted the hearing aid was not associated with the amount of hearing aid use (p = 0.77), the lack of hearing aid handling skills (p = 0.20), or feedback problems (p = 0.17).

Discussion

The target population of this study was large, and the response rate of 66.7% can be regarded as moderate, although not good. This population-based study model does not enable direct evaluation of the response rate of hearing aid users and nonusers, which can be regarded as a major limitation. The 9.2% prevalence of hearing aid users in this study was smaller than in another study from Finland, but the target population in our study was younger. A direct interview of known hearing aid users could result in a better response rate and a larger sample. However, the anonymity provided by this population-based questionnaire may have resulted in the subjects reporting their problems without feeling the need to be polite to the interviewer and may thus have led to less biased responses.

Our study confirmed that a significant amount of hearing aids are used occasionally or never, although our results are more favorable than in a previous study by Sorri et al. Hearing aid use did not decline significantly with advancing age; this finding is similar to that of other recent studies, and differs from that of older studies by Surr et al. The overall percentage of nonusers appears to be declining compared to the older studies, a finding similar to that of Vuorialho et al. The recent advances in hearing aid technology presumably improve compliance by decreasing disturbing noise and feedback and by making the handling of the hearing aids easier. A significant improvement in quality of life was reported in a study by Yueh et al., which compared traditional hearing aids with digital hearing aids. Nevertheless, it is important to note that technical problems are not the only reason for poor compliance.

Aging has an effect on the motor skills of patients. One-fifth of the patients with poor compliance in the present study reported problems with getting the hearing aid in the ear. Stephens and Meredith reported that patients over 75 years...
of age had significantly more problems handling hearing aids in general. They also reported BTE hearing aids were easier to handle than ITE hearing aids. A similar tendency was found in our study, although it was not significant. BTE hearing aids were used more often, but they were also fitted to subjects with more severe hearing loss, who therefore had more need for the hearing aid. Historically, impaired dexterity has made it more difficult for users to adjust the volume control of the hearing aid, leading to disturbing loud noises. The emergence of adaptive hearing aids has reduced the need for adjustments by the patient. Hence, diseases that may be associated with problems in hearing aid handling (e.g., Parkinson disease and dementia) are not contraindications to hearing aid fitting. Easy handling of a hearing aid was the only attribute that was significantly more favored by older compared to younger subjects in a study that evaluated user preferences for hearing aids. It is important to select a hearing aid that is easy for the patient to handle. It is also often possible to instruct a family member or a nurse to put the hearing aid in the patient’s ear; this is an easy solution to handling problems that is often forgotten. Hearing aid maintenance can also be performed by others. ITE hearing aids are often initially preferred by patients because of cosmetic appearance, but only one subject reported a fear of others seeing the hearing aid as a reason for minimal use. This is also a topic that should be discussed during the fitting process. Most patients are likely to agree that good hearing is the main objective in hearing aid fitting, although other indications, such as tinnitus, are also possible.

The need for a hearing aid depends not only upon measurable levels of hearing. Even marked difficulties in hearing, for example, in a physician’s office, do not mean that the patient will want to use a hearing aid. One-fifth of patients with poor compliance stated that hearing aid fitting was undertaken in response to requests by relatives, and one-tenth felt that their hearing was so good they did not need a hearing aid. If the patient does not feel negative effects from the hearing impairment, it is more likely that he or she will not use a hearing aid. In a previous study, we found that only 76% of subjects with at least a mild hearing loss (pure tone average of >25 dB for frequencies 0.5-4 kHz in the better ear) felt themselves to be hearing impaired. Therefore, it is important to discuss hearing problems with the patient, especially in countries where hearing aid fitting is provided by the public health care system and the patient does not have to invest in the hearing aid him or herself. Hearing aids remain a delicate subject for many people, and motivation is important to successful hearing aid fitting. The importance of motivation for hearing aid compliance is also apparent in the present study; many of the problems with hearing aid use were seen equally in users and nonusers (e.g., background noise, uncomfortable ear mold, and battery costs). These problems will be tolerated better if the patient is motivated to use a hearing aid.

Poor hearing aid compliance may also be a consequence of the patient’s social situation. About one-sixth of the respondents in the poor compliance group stated that they were so lonely there was no need for a hearing aid. On the other hand, loneliness can be a consequence of hearing loss; hearing problems are thought to result in isolation from social contacts, although the evidence for this is weak. A lack of social contacts may also explain minimal use. A patient who lives alone is often in a silent environment. If a patient uses his or her hearing aid only rarely, then he or she may never learn that the normal environment is full of sounds. These environmental sounds are then experienced as disturbing noise, and as a negative effect of the hearing aid, although they are a part of everyday life for normal-hearing people and experienced hearing aid users. A new hearing aid user needs to be counseled that he or she will have to learn to hear again, and that this learning will continue for a long time.

Another social aspect of hearing aid use is battery cost; 13.5% of poorly compliant patients in the present study regarded the battery costs to be excessive. This might represent more of an excuse for poor compliance, because patients with the greatest financial need can get financial support for batteries from social security. Furthermore, subjects who used the hearing aid daily complained of this matter more often (22.8%). When a hearing aid is fitted, the patient should be informed of the battery costs, the sources of supply, and possible financial support by insurance or social security.

Hearing impairment is very common in the elderly; it ranges from about 25% at the age of 70 years to about 50% at the age of 85 years. It appears that 25-30% of patients who own a hearing aid in these age groups use their hearing aids occasionally or never; thus, we are facing a major waste
of resources. Health care providers should identify patients who not only need hearing rehabilitation, are also motivated for it. Patients who do not want a hearing aid should be informed of the positive and negative aspects of hearing aids, and they should be encouraged to seek help if needed. The disturbing effect of noise is likely to be better tolerated with modern adaptive hearing aids. Counseling patients about the common pitfalls of hearing aid use is important, and appropriate follow-up and support methods should be provided after hearing aid fitting. Attitudes concerning hearing loss and hearing aids are slowly changing in the community.

Conclusion

Advances in hearing aid technology are improving compliance with hearing aid use in the elderly. However, disturbing noise and feedback problems were reported equally as frequently by those who wore and did not wear their hearing aids daily. Problems that were significantly more common in the low-compliance group were problems with handling and getting the hearing aid in the ear, a lack of social contacts, and lack of a subjective need for a hearing aid (“my hearing is too good”). Therefore, one of the most effective ways to improve the efficacy of the hearing aid fitting process may be to enhance communication with the patient before referring them for hearing aid fitting, as well as during fitting and counseling.

References


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