Volume xxvii, Number 1. Pages 15-19

A Primer on Hearing Loss in the Elderly

By Barbara E. Weinstein

Hearing loss is a prevalent chronic condition affecting older people. Approximately 30 percent of adults over 65 years of age experience handicapping hearing loss. Untreated, hearing loss has significant social, cognitive, and emotional consequences. Fortunately, a variety of interventions and technologies are available to help older people overcome these communicative and psychosocial effects.

A variety of interventions and technologies are available.

Age-Related Changes

The auditory system, the sensory network underlying hearing and balance, is prone to the degenerative changes that take place throughout the body as individuals age. Specifically, age-related changes take place in sensory, neural, vascular, supporting, synaptic, and mechanical structures within the peripheral and central parts of the system. The Organ of Corti, a structure within the snail-shaped cochlea, which houses the sense organ of hearing, is most susceptible to age-related changes (Schuknecht, 1993). The cochlea is the site of transduction of mechanical energy to neural energy. Age-related atrophy, most prominent in the basal end of the cochlea, interferes with the reception of high-frequency sounds, thereby compromising the understanding of speech in a quiet environment. Further, disease-associated changes within the auditory brainstem pathways and auditory cortex have profound implications for speech understanding in large areas and noisy areas. The degenerative changes that take place in the peripheral and central auditory mechanisms are the hallmark of age-related sensorineural hearing loss commonly referred to as presbycusis. Sensorineural hearing loss is the hearing loss and associated speech-understanding problems experienced by older adults that result from atrophic changes within the sensory and neural systems. Sensorineural hearing loss is associated with a loss of the ability to hear sound and to hear speech clearly.

The sensory structures within the vestibular or balance mechanism of the inner ear also undergo considerable degenerative change with age. For example, the decline in hair-cell population in these structures that occurs with age contributes in part to the dizziness, instability, and falls so prevalent among older adults.

In addition to age-related degeneration, a number of other factors can lead to or exacerbate the hearing loss that is associated with aging. These factors include exposure to occupational or recreational noise, genetic factors, trauma, metabolic disease in organs like the kid-

ney; vascular disease; infections; and ingestion of agents that have an ototoxic effect—one that is damaging to hearing and balance. For example, some diuretics and chemotherapeutic drugs are damaging to the auditory system. Impacted wax build-up in the ear canal is also quite prevalent in older adults for various reasons, including an increase in the size of sebaceous glands. This condition interferes with conduction of sound from the outer to the middle ear and is often associated with conductive-type hearing loss, which tends to be mild yet can interfere with speech reception. In addition, wax lodged in the external ear canal is a frequent cause of malfunctioning hearing aids. Conductive hearing loss is amenable to medical intervention. In contrast, the sensorineural hearing loss associated with age, noise exposure, and ototoxicity can only be treated with hearing technologies and rehabilitation.

The majority of recent studies on hearing loss characterizing noninstitutionalized older adults confirm that presbycusis has several distinguishing features. First, pure-tone hearing sensitivity tends to decline with increasing age, and the hearing loss tends to be greatest in the higher frequencies. Further, the hearing loss tends to be bilateral, symmetrical, and sensorineural in origin (Gates et al., 1991). The decline in high-frequency sensitivity appears to be greatest in men, whereas the decline in low-frequency thresholds tends to be greatest in women of comparable age. The severity of hearing loss typical of men can be described as mild to moderately severe, whereas women tend to exhibit mild to moderate hearing loss. Among residents of nursing facilities, sensorineural hearing loss is more significant, from moderately severe to severe, and more prevalent. Residents of nursing facilities tend to be prone to wax impaction and the concomitant problems.

The best clue to the presence of age-related hearing loss is the phrase "I can hear people talking but I can't make out the words," which is the most common complaint of older adults with presbycusis.

Consequences to Quality of Life

In general, hearing loss in older adults restricts one or more dimensions of quality of life, including physical functional status and cognitive, emotional, and social function. Specifically, hearing impairment has been shown to do the following: interfere with face-to-face and long-distance communication; alter psychosocial behavior; strain family relations; limit the enjoyment of daily activities; jeopardize physical well-being; compromise independence; interfere with accurate medical diagnosis, treatment, and management; and interfere with therapeutic interventions across all disciplines including social work, speech-language therapy, and physical or occupational therapy. It is important to note that there is rather large variability among older adults in their response to a given hearing loss. The fact that people react differently to the same degree of hearing loss underlines the importance of an audiologic evaluation at regular intervals to determine whether a hearing loss exists, and if in fact it affects the individual and family members.

Rehabilitation

Once hearing impairment is documented and the etiology and associated activity limitations and participation restrictions are identified, an older adult should undergo some form of audiological rehabilitation. The American Speech-Language-Hearing Association defines audiological rehabilitation with older adults as an interactive, problem-solving process. It is designed to facilitate the person's ability to minimize or prevent the limitations and restrictions that auditory dysfunctions can impose on well-being and communication, including interpersonal, psychosocial, and vocational functioning. Audiological rehabilitation, which is outcome-based, combines the use of a variety of hearing technologies with counseling. Depending on the individual's motivational level and readiness to overcome the communication handicap, available options include the following:

(1) use of hearing-assistive devices for the television, radio, and telephone; (2) hearing aids that can make sounds audible at a comfortable level, tolerable, and comprehensible; (3) patient and family counseling to promote adjustment to hearing loss, hearing aids, and hearing-assistive technology; (4) orientation to hearing-aid use;

(5) hearing-aid maintenance and troubleshooting; (6) training in strategies for assertiveness and communication; (7) counseling to foster realistic expectations from hearing-aid use; and (8) outcomes assessment.

Counseling to provide information and to foster personal adjustment is an especially important aspect of audiological intervention. Different forms of counseling are appropriate, depending on the patient. For those people with hearing impairment who do not acknowledge their hearing loss, the focus should be on helping to raise their awareness of the link between specific behaviors and hearing impairment. For people who do acknowledge their hearing loss but do not wish to invest in costly hearing aids, motivational counseling coupled with the purchase of inexpensive hearing-assistive technology like an infrared system for television viewing could be the approach to take. Finally, for people who are motivated to purchase hearing aids, counseling to foster realistic expectations is often appropriate. Realistic expectations are of utmost importance; the more a person understands the advantages and limitations of a particular hearing aid and the more realistic his or her idea of the device's ultimate performance, the more satisfied the person will be.

A variety of hearing aids and other assistive listening devices are available once it has been decided that such a device is the appropriate intervention. See Montano, this issue, for a full discussion of the equipment available, how it is used, and the pros and cons of each type.

Outcomes with Hearing Aids

Weinstein (1997, 2000) summarized studies conducted by a variety of investigators on the beneficial effects of hearing aids used by older adults. First, beneficial outcomes in the psychosocial domain are evident three to six weeks after fitting of the hearing aid. Acclimatization or adjustment to hearing aids takes from six weeks to three months and can be sustained throughout one year in the emotional and social domains of function. Third, some 70 percent to 80 percent of older adults who use hearing aids dispensed by audiologists experience significant reductions in hearing handicap associated with hearing-aid use.

A large-scale survey of over two thousand hearing-aid users was recently completed by the National Council on the Aging (1999). More than half of the hearing-aid users claimed that their relationships at home and the overall quality of their lives improved once they began using hearing aids. Hearing-aid users were reportedly less depressed and more socially engaged than older adults with comparable hearing loss who did not use hearing aids. Interestingly, more than half of family members reported observing improvements in interpersonal relationships with family members and at work among hearing-aid users. Among individuals who reported mild to moderate hearing difficulties, hearing-aid users were more active socially than non-users who reported the same degree of hearing difficulty.

In contrast, those who did not use hearing aids reported more negative social effects of hearing loss than users and higher levels of anger, depressive symptoms, and frustration. It is noteworthy that non-hearing-aid users with significant hearing loss tended to report a loss of interest in activities that at one time had given them pleasure. What is more, families of non-users who reported substantial hearing loss noted that their family member was more likely to miss instructions from the doctor or pharmacist regarding medication use. Finally, non-hearing-aid users who reported significant hearing difficulties were less likely to become engaged in conversation than hearing-aid users (NCOA, 1999).

Outcomes with Hearing Aids and Audiological Rehabilitation

Studies have also shown that hearing-aid use plus audiological rehabilitation was a more cost-effective intervention in terms of improvements in perceptions of health-related quality of life in the psychological domain than hearing-aid provision. One unexpected benefit of audiological rehabilitation following the fitting of the hearing aid is a reduction in the return rate of hearing aids because of dissatisfaction (Northern and Beyer, 1999).

Where to Go For Help

Audiologists, professionals with a master's degree and clinical certification, work in a vari-

ety of settings throughout the country. Audiologists in private practice tend to have a caseload that includes older adults who require aids. University clinics or freestanding speech and hearing centers typically dispense hearing aids and offer audiological rehabilitation in conjunction with delivery of the product. Many of these facilities house centers for assistive listening devices where people with hearing impairment can experience the benefits of media-based, telecommunication, and signal-alerting technology. It is important to note that audiology practices vary considerably in terms of the time they devote to counseling, rehabilitation, and alternative technologies. Hence, service professionals should arm their hearing-impaired clients with the necessary information to ensure that (1) the audiologist is patient-centered; (2) clients do not overpay for hearing aids; (3) clients are not obligated to purchase hearing aids; and (4) they undergo a thorough audiologic evaluation and counseling session. The following website contains links to hearing healthcare professionals in the fifty states and throughout the world. The site also contains consumer resources, and a link to an interesting site, "Ask the Audiologist," *http://www.audiology.org/consumer/faa.php*. The Appendix below provides an easy-to-use screening device to help practitioners determine whether their clients should be referred to an audiologist.

Conclusion

Hearing loss is a prevalent condition among older adults with considerable impact on function and quality of life. Yet, while hearing aids and other assistive hearing technologies, along with rehabilitation, have been shown to be effective in addressing age-related hearing loss, only about 20 percent of older adults with hearing loss actually use them (Popelka, Cruickshanks, and Wiley, 1991). The significant communicative and psychosocial effects of hearing loss, the high percentage of older adults suffering from it, and the cost-utility of hearing aids all support the notion that older adults should be encouraged to acquire hearing aids before hearing loss becomes an intolerable burden and less responsive to intervention. Healthcare professionals and audiologists must work together to fulfill the mandate of *Healthy People 2000*, to ensure that the majority of older adults are screened for hearing loss and referred for the necessary interventions.

Barbara E. Weinstein, Ph.D., is professor, Lehman College, Graduate School and University Center, City University of New York, New York.

References

Gates, G., et al. 1991. "Hearing in the Elderly: The Framingham Cohort, 1983–1985. Part 1. Basic Audiometric Test Results." *Ear Hearing* 4: 247–56.

National Council on the Aging. 1999. The Consequences of Untreated Hearing Loss in Older Persons. Study conducted by the Seniors Research Group, an alliance between The National Council on the Aging and Market Strategies Inc. Washington, D.C.

Northern, J. L., and Beyer, C. M. 1999. "Reducing Hearing Aid Returns Through Patient Education." *Audiology Today* 11(2): 10–11

Popelka, M. M., Cruikshanks, K., and Wiley, T., et al. 1998. "Low Prevalence of Hearing Aid Use Among Older Adults with Hearing Loss: The Epidemiology of Hearing Loss Study." *J ournal of the American Geriatrics Society* 46: 1075–8.

Schuknecht, H. 1993. *Pathology of the Ear*, 2nd ed. Philadelphia: Lea & Febiger.

Ventry, I., and Weinstein, B. 1982. "The Hearing Handicap Inventory for the Elderly: A New Tool." *Ear Hearing* 3: 128–34.

Weinstein, B. 2000. *Geriatric Audiology*. New York: Thieme Medical Publishers.

Weinstein, B. 1997. "Outcome Measures in the Hearing Aid Fitting/Selection Process." *Trends in Amplification* 4: 117–37.

Appendix

Screening Version of the Hearing Handicap Inventory for the Elderly (HHIE-S)

Instructions: Answer *Yes* (4 points), *Sometimes* (2 points), or *No* (0 points) for each question. If you are a hearing aid user answer questions according to how you hear with the hearing aid. If the question does not apply merely enter no as your response.

E-1. Does a hearing problem cause you to feel embarrassed when meeting new people?

E-2. Does a hearing problem cause you to feel frustrated when talking to members of your family?

S-1. Do you have difficulty hearing when someone speaks in a whisper?

E-3. Do you feel handicapped by a hearing problem?

S-2. Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?

S-3. Does a hearing problem cause you to attend religious services less often than you would like?

E-4. Does a hearing problem cause you to have arguments with family members?

S-4. Does a hearing problem cause you difficulty when listening to TV or radio?

E-5. Do you feel that any difficulty with your hearing limits or hampers your personal or social life?

S-5. Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?

Abbreviations: S, items probe social/situational consequences of hearing loss; E, items probe emotional consequences of hearing loss.

Total Score: (Refer if score > 8)

---

source: Ventry and Weinstein, 1982