



HHS Public Access

Author manuscript

J Am Med Dir Assoc. Author manuscript; available in PMC 2018 April 11.

Published in final edited form as:

J Am Med Dir Assoc. 2018 April ; 19(4): 323–327. doi:10.1016/j.jamda.2017.12.007.

Hearing Loss: Why Does It Matter for Nursing Homes?

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Abstract

Over the past decade, hearing loss has emerged as a key issue for aging and health. We describe why hearing loss may be especially disabling in nursing home settings and provide an estimate of prevalence using the Minimum Data Set (MDS v.3.0). We outline steps to mitigate hearing loss. Many solutions are inexpensive and low-tech, but require significant awareness and institutional commitment.

Keywords

Hearing loss; nursing home; quality of life; Minimum Data Set

According to the World Health Organization, hearing loss is now the fourth greatest contributor to years lost to disability [YLDs] globally.¹ Among Americans age 80 and over, the number with hearing loss that is moderate or greater will more than double over the next 25 years.² Hearing loss is associated with social isolation,^{3,4} depression,⁵ and cognitive impairment,^{6,7} conditions that contribute greatly to morbidity and mortality in aging.

Although hearing loss has long been recognized as a problem in nursing homes, the implications for quality of life have not been widely appreciated, and solutions have remained elusive. We begin this article by clarifying why hearing loss is so disabling for nursing home residents, and provide current national estimates of its prevalence among residents. We then describe opportunities and barriers to improved hearing for those living in nursing homes.

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The authors declare no conflicts of interest.

Why Is Hearing Loss Disabling? The Importance of “Difficult Listening Situations” and Cognitive Demand

Hearing loss is not primarily a problem with detecting sound. Rather, it is a problem of understanding speech. Many people with hearing loss hear sound relatively well, and many have good speech understanding in the right environments: for example, in quiet rooms, in one-on-one conversations, or when the speaker faces them. Disability emerges when the environment is less than optimal, for example, in noisy or poorly insulated rooms or when the speaker is not directly facing the listener, depriving the listener of the facial cues and gestures that help to fill in the gaps in hearing. In these “difficult listening situations,” people with hearing loss must recruit more cognitive resources to extract meaning from the spoken message.

Research has begun to illuminate the role of cognition in speech understanding.^{8,9} Because speech is acoustically degraded in hearing loss, understanding engages greater cognitive resources (such as working memory and attention).⁸ Successful comprehension requires increased effort and motivation. When demand exceeds capacity, the listener may have no choice but to withdraw from conversation. In challenging listening environments (eg, high ambient noise), this will occur earlier and more often, and withdrawal may become a habitual response.

In sum, for a given level of hearing loss, disability depends on environmental context. But it also depends on availability of cognitive resources and motivation to invest listening effort.⁹

Nursing Homes Are Difficult Listening Situations, and Many Residents Are Cognitively Impaired

Care is often delivered in noisy settings, and nursing homes are no exception. Residents typically spend many waking hours in high-traffic, high-noise areas: televisions blare, intercoms sound, carts transport equipment, and both residents and staff call out intermittently.^{10,11} Sound levels are often too high to support effective speech communication: in a study of 20 urban nursing homes, the mean noise level in common areas was 64 dB¹²; in another study, peak noise at mealtimes was higher than 90 db.¹⁰ These levels of noise, recorded in locations where residents would typically socialize, would be challenging even for someone with normal hearing.

More than 70% of long-stay nursing home residents have some cognitive impairment; half are moderately to severely impaired.¹³ Most common etiologies of impairment are likely to reflect the population prevalence of Alzheimer disease and related dementia (ADRD), and with increasing severity, multiple cognitive domains are more critically impacted. This translates to less cognitive reserve and capacity to accommodate to degraded speech.⁸ Lacking the cognitive reserve to separate speech from noise, residents with cognitive impairment may be particularly vulnerable to failure to understand speech in noisy environments. Other conditions common among nursing home residents (eg, depression and chronic pain¹⁴) are likely to further decrease motivation to invest listening effort.

The Nursing Home Population Is Elderly, and Thus Is at High Risk for Hearing Loss

Hearing loss rises with age. Table 1 shows prevalence estimates for adults aged 70 and older, drawn from analyses of the National Health and Nutrition Survey (NHANES) conducted by Choi and colleagues.¹⁵ Hearing loss was assessed objectively (by audiometry) and subjectively (via self-report); assessment details are shown in the table notes. Objectively, only one-third (32%) of people aged 70 and older are without some degree of clinically significant loss on audiometry. Subjects report somewhat better hearing in response to the NHANES question “Which statement best describes your hearing (without a hearing aid)? Would you say that your hearing is excellent, good, that you have a little trouble, moderate trouble, a lot of trouble, or are you deaf?” Subjectively, 50% of respondents rate their hearing as “excellent” or “good”; the other 50% have at least “a little trouble hearing.”

A National Estimate of the Prevalence of Hearing Loss Among Nursing Home Residents

The NHANES sample is drawn from community dwellers; there are no analogous nationwide objective (audiometric) assessments of hearing loss among nursing home residents. However, US nursing homes report to the federal government about the health of all residents, using the Resident Assessment Instrument (RAI).¹⁶ The data collected from these assessments, known as the Minimum Data Set (MDS v.3.0), includes a subjective measure of hearing ability. The criteria for hearing assessment are detailed in Table 2. Briefly, the MDS assessor gathers information from conversations with and observations of the resident, as well the medical record and conversations with staff and family. The assessor then assigns a summary rating on a scale of 1 to 4, where 1 is “adequate,” indicating that the resident has “no difficulty in normal conversation, social interaction, or listening to TV and he or she hear(s) all normal conversational speech and telephone conversation and announcements in group activities,” and 4 is “highly impaired,” indicating an “absence of useful hearing.”

In analyzing the MDS reports, we focused on all long-stay residents from 2016 (or anyone who had a quarterly assessment, based on being in a nursing home at least 90 consecutive days during 2016), because their well-being is in the hands of the institution. They are overwhelmingly likely to live there for the rest of their lives.¹⁷ To the extent that the facility has the capacity to recognize disability and provide accommodation, quality of life could improve for the remainder of the residents’ lives.

We confined our sample to long-stay residents aged 70 and older, for comparability to the NHANES reports. Our sample had 1,108,610 residents who were ever long-stay in 2016. As shown in Table 1 more than two-thirds (68%) of long-stay residents aged 70 and older reportedly had adequate (“no difficulty”) hearing. Even among those 80 and older, 62% of long-stay residents reportedly enjoyed adequate hearing, having “no difficulty in normal conversation, social interaction, and group activities.”

The MDS reports are therefore at striking odds with the NHANES subjective estimates from community dwellers (eg, 62% of those 80 years old and older having “adequate” hearing with “no difficulty” in the MDS versus only 44% of those 80 years and older enjoying “excellent or good” hearing in the NHANES). Several factors could account for the discrepancy. One is that the NHANES question references ability “without a hearing aid” whereas the MDS protocol allows hearing aids to be worn; thus, the MDS measures will reflect better hearing. This can be explored within the MDS data, which include an indicator of whether a hearing aid was used by the resident (measure B0300). Our analysis found that only 9% of residents wore a hearing aid at some point during the assessment. This is sufficiently rare that it is unlikely to explain the discrepancy. Moreover, excluding subjects with hearing aids did not substantially change the findings displayed in Table 1 (data not shown).

Another possibility is that nursing home residents have an inherently lower risk of hearing loss than people residing in the community. This too is unlikely; in fact, long-stay residents probably have a higher risk of hearing loss than their same-aged peers in the community due to the association between hearing loss and chronic conditions such as cardiovascular disease, diabetes and dementia, which are highly prevalent among nursing home residents.¹⁴

Yet another possibility is that the discrepancy is an artifact of measurement. The 2 subjective measures draw on different sources. NHANES draws only on direct questioning of the subject whereas the MDS is a global subjective assessment based on observation and conversation with the resident, as well as discussion with staff and family, and a review of the medical record (see Table 2 for details of the protocol). But these differences should make the MDS estimate of hearing loss *higher* than the estimate from the NHANES, if anything. Another measurement difference may lie in expectations of hearing function. In institutionalized populations hearing may not be perfect, but it is “adequate” for the nursing home environment, where hearing loss is the local norm. Alternatively, assessors may conflate hearing loss and cognitive impairment: when a resident fails to respond or responds inappropriately to speech, the assessor may ascribe that failure to cognitive impairment, especially when the resident carries that diagnosis. This phenomenon of hearing loss masquerading as cognitive impairment is not well described in the geriatric literature, but it may be quite important clinically, as evidenced by reports that performance on cognitive screening tests can improve when hearing assistance is provided to older people.¹⁸ However in our MDS sample, reports of hearing difficulty were higher among people with cognitive impairment, even after adjusting for age (data not shown).

Finally, the low rate of reported hearing loss in the MDS may reflect a degree of failure to recognize hearing difficulties among nursing home residents, on a national scale. This interpretation is bolstered by many prior reports from individual facilities.^{19–22} A particularly detailed and methodologically rigorous study of 279 residents in one home, Cohen-Mansfield and Taylor (2004) found that 108 residents (38.7%) had some degree of hearing difficulty reported on the MDS. But when assessed by other sources (the resident, the resident’s caregiver, and a research assistant using subjective assessment), 175 residents (62.7%) had probable hearing loss, based on at least 1 report. Assuming that at least 1

positive report reflected true hearing impairment, the MDS assessment captured 108 of 175, or 61.7%, of the true cases of hearing impairment and failed to capture 38.3% of them.

Our analysis does not allow us to assess the relative contribution of these various factors. But to the extent that hearing loss goes undetected and untreated, resident health and well-being will suffer.

Planning Care for Residents With Hearing Loss

Table 2 shows the care planning steps that are laid out in the MDS manual, for residents who are found to have hearing difficulty. The recommendations include simple screening for reversible causes of hearing loss, behavior change, environmental modification, and the provision of low-tech, low-cost devices. Notably, the term *hearing aid* does not appear.

For example, regular checks for impacted cerumen (ie, ear wax) can be effective in overcoming a reversible cause of hearing impairment among older people. One study found a rate of 25% of cerumen impaction (at least 1 canal totally occluded) among residents of 8 nursing homes.²³

Staff education and behavior change are key. Staff should understand the degree to which hearing loss influences for social well-being. Staff can be trained to understand the difficulty in difficult listening situations, and taught strategies that will facilitate better communication such as saying the resident's name before starting a conversation, facing the resident, and keeping hands away from face while communicating.

Environmental modification is important, because reducing noise is one of most effective ways to minimize disability. Televisions and voices are important sources; one study of 8 nursing homes found that overwhelmingly, voice noise emanates from staff-to-staff communication, rather than discussion involving residents.¹⁰ Although it is difficult to change staff behaviors around noise-making, staff education and "quiet hours" programs have been successful in some health care facilities.²⁴ Built solutions can also improve the sound environment. In health care settings, can be particularly effective installing high-performance sound-absorbing acoustical tile and providing private rooms.²⁴ These costly steps are likely out of reach for many nursing homes, leaving noise reduction as a primary accommodation strategy.

Finally, the MDS manual suggests that some residents be provided with "hearing assistance devices." It bears emphasis that this does not necessarily refer to hearing aids. Some residents may benefit from wearing hearing aids. Those successfully using an aid on admission should be encouraged to continue; devices must be checked regularly to ensure that they are operational, and batteries must be changed regularly. But hearing aids may be a less practical solution for residents who have not previously used them. Barriers include high cost, limited access to assistance, and difficulty with self-management. Aids typically cost \$2000 each, and presbycusis is typically bilateral.²⁵ The cost of aids is not covered by Medicare; although it is covered by Medicaid in some states, the reimbursement rate is typically very low.²⁵ Even when cost barriers are overcome, new users need help adapting: hearing aids amplify both wanted and unwanted sounds, and new wearers must be

encouraged and assisted. Finally, hearing aids require maintenance, and facilities may lack a “chain of command” to ensure that devices continue to fit and function. One study found that 64% of the devices owned by nursing home residents were malfunctioning.²⁶ A study of hearing health care in one nursing facility found that 86% of residents who owned hearing aids needed help taking care of them, but many staff had not received training in hearing aid use or maintenance.²⁷ The authors concluded that “barriers to hearing aid use are ... complex and multifactorial, involving lack of system commitment to utilization of hearing aids, lack of knowledge by staff members, inappropriate delegation and care procedures, hearing aid design and fit issues, and difficulties with residents in handling the hearing aids.” Solutions lie “at the institutional level, concerning policy and training; change at the unit level, regarding care procedures and follow up; change at the individual level, providing better checks of fit and function of the hearing aids; and finally, change at the societal level, addressing design and cost issues for hearing aids in this population.”²⁷

This does not mean that hearing assistance devices are out of the reach of most nursing home residents. On the contrary, simple over-the-counter hearing assistance devices such as PockeTalkers can effectively facilitate one-to-one conversation. Various low cost (ca. \$150-\$299) over-the-counter assistive devices have been used successfully to improve daily functioning among older people²⁸ and people with dementia specifically.²⁹ Low-cost hearing assistance devices have also been used successfully in hospital settings to improve communication between patients, their families, and clinicians.^{30,31}

Conclusions and Implications

Hearing loss disrupts communication, leaving those affected especially vulnerable to social isolation and depression. Our analysis of the MDS data suggests—but does not prove—that the previously documented failure to recognize hearing loss in individual facilities translates to a nationwide pattern of under-detection of hearing loss among nursing home residents. Facilities should be aware that hearing loss is a recognized disability under the Americans with Disabilities Act (ADA). Nursing homes (as covered entities) are required to ensure “effective communication” with residents.³² In other words, recognition and accommodation are not just good clinical practice; they are required under the law.

The MDS manual outlines several steps that caregivers can take to mitigate disability due to hearing loss. Many of those steps are low-tech and low-cost, but they require institutional recognition of the nature and scope of the problem. They also require institutional commitment to finding solutions to improve residents’ daily lives.

Acknowledgments

We thank Michael Mangold for his expert research assistance. This work was supported by the New York University Freedman Program on Cognition and Aging, and by T32 HS000011-30 AHRQ “National Research Service Award” and P01 AG027296-07 NIA “Changing Long Term Care in America: Policies, Markets, Strategies, and Outcomes.”

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Table 1
Assessed Degree of Hearing Loss Among People Aged 70 and Older in the United States, by Age Group, Place of Residence, and Source of Assessment

Source of Assessment	People Living in the Community				Long-Stay Nursing Home Residents				
	NHANES Audiometry, * % (n = 1669)		NHANES Self Report, † % (n = 1669)		MDS Assessor, ‡ % (n = 1,108,610)				
Age Group	No Clinically Significant Loss	Mild Clinically Significant Loss	Moderate or Greater Clinically Significant Loss	Excellent or Good Hearing	A Little Trouble Hearing	Moderate or Greater Trouble Hearing	Adequate Hearing	Minimal Difficulty Hearing	Moderate Difficulty or Highly Impaired
70-74	47	35	18	54	28	19	85	11	4
75-79	33	37	30	53	24	24	80	15	5
80	16	35	49	44	26	30	62	24	13
All 70 and over	32	35	33	50	26	24	68	21	11

* Source: Analysis of NHANES data reported in Choi et al.¹⁵ Based on speech-frequency pure tone audiometry. Hearing loss classified according to criteria defined by the World Health Organization, with degree of loss determined with respect to average thresholds in the better hearing ear. Age groupings reflect those presented by the authors.

† Source: Analysis of NHANES data reported in Choi et al.¹⁵ Based on self-report in response to “Which statement best describes your hearing (without a hearing aid)? Would you say that your hearing is excellent, good, that you have a little trouble, moderate trouble, a lot of trouble, or are you deaf?”

‡ Source: Author’s analysis of MDS data for all long-stay nursing home residents in 2016. Classification of hearing difficulty based on the MDS assessor’s interviews with the resident about hearing function, observation of the resident, review of the medical record, and “consultation with the resident’s family, direct care staff, activities personnel, and speech and hearing specialists.” “Adequate hearing” means that the resident has no difficulty in normal conversation, social interaction, or listening to TV. The resident hears all normal conversational speech and telephone conversation and announcements in group activities.” Further details on the assessment protocol and interpretation of categories can be found in Table 2. Age groupings parallel to those presented by Choi et al.¹⁵

Table 2

**Approach for Assessing Hearing Loss and Planning for Care in the Nursing Home Setting with Text
Condensed from the MDS 3.0 Manual***

Steps for Assessment

1. Ensure that the resident is using his or her normal hearing appliance if they have one.
 - Some residents may use hearing amplifiers or a microphone and headphones as an alternative to hearing aids.
2. Ensure whatever hearing appliance is used, it is operational.
3. Interview the resident.
 - Ask about hearing function in different situations.
4. Observe the resident during your verbal interactions and when he or she interacts with others throughout the day.
5. Think through how you can best communicate with the resident.
 - You may need to speak more clearly, use a louder tone, speak more slowly or use gestures.
 - The resident may need to see your face to understand what you are saying.
 - You may need to take the resident to a quieter area for them to hear you.
 - All of these are cues that there is a hearing problem.
6. Review the medical record.
7. Consult the resident’s family, direct care staff, activities personnel, and speech or hearing specialists.

Response Categories

Adequate:

- No difficulty in normal conversation, social interaction, or listening to TV.

Minimal difficulty:

- Difficulty in some environments (eg, when a person speaks softly or the setting is noisy).
- The resident’s hearing is adequate after environmental adjustments are made, such as moving to a quiet room.

Moderate difficulty:

- Speaker has to increase volume and speak distinctly.
- Resident compensates when the speaker adjusts tonal quality and speaks distinctly.
- Resident can hear only when the speaker’s face is clearly visible.

Highly impaired:

- Absence of useful hearing.
- There is no comprehension of conversational speech, even when the speaker makes maximum adjustments.

Planning for care

1. Address reversible causes of hearing difficulty (such as cerumen impaction).
2. Evaluate potential benefit from hearing assistance devices.
3. Offer assistance to residents with hearing difficulties to avoid social isolation.
4. Consider other communication strategies for persons with hearing loss that is not reversible or not completely corrected with hearing devices.
5. Adjust environment by reducing background noise by lowering the sound volume on televisions or radios.

* Entries in this table are condensed, simplified versions of entries in the MDS 3.0 manual. The full text is available in The Centers for Medicare & Medicaid Services. Long-Term Care Facility Resident Assessment Instrument 3.0 User’s Manual, Version 1.15. October 2017. Available at: www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/MDS30RAIManual.html. Accessed November 25, 2017.