BRIEF REPORT

Medical Record Documentation of Patients' Hearing Loss by Physicians

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BACKGROUND: Anecdotal evidence suggests that hearing loss, even when sufficient to prevent full access to spoken communication, often is underreported by patients and not documented by physicians. No published studies have investigated this issue quantitatively.

OBJECTIVE: To assess the documentation of hearing loss in comprehensive physician notes in cases where the patients are known to have substantial binaural loss.

DESIGN: Electronic medical record (EMR) notes for 100 consecutive patients with substantial binaural hearing loss were reviewed retrospectively at a large academic medical center. All records reviewed were created within 2 years before the patient's audiometry. Comprehensive physician notes containing the headings "History" and "Physical Exam" were examined for documentation of hearing loss and scored as: no mention of loss; finding of loss; or hearing reported as normal.

PARTICIPANTS: Consecutive adult patients with substantial binaural hearing loss by audiometry who also had a comprehensive medical assessment in their electronic medical record created within 2 years before audiometry.

RESULTS: Thirty-six percent of EMRs had no mention of hearing loss, 28% reported some loss, and 36% percent indicated that hearing was normal.

CONCLUSIONS: Substantial hearing loss, sufficient to prevent effective communication in the medical setting, often is underdocumented in medical records.

KEY WORDS: hearing loss; electronic medical record; patient communication.

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Hearing loss is a common disorder that can cause significant communication difficulties and directly affects the accurate transfer of information during a medical encounter.^{1,2} Anecdotal evidence suggests that patients

under-report hearing loss and physicians may not document this condition. Electronic searches of the literature produced no previous studies quantifying this issue, although one recent publication discussed the concern.³

Documentation of hearing loss in the electronic medical record (EMR) can remind physicians that it is necessary to accommodate patient's communication needs and thus improve the quality of interpersonal interactions and information transmission between patients and physicians. Widespread use of EMR in our facility offered us the opportunity to investigate how often physicians document known substantial binaural hearing loss in notes summarizing comprehensive medical histories and physical examinations.

METHODS

Sample

We screened all patients (approximately 1,200) who underwent audiometry during 16 consecutive days (7/18/07–8/10/07) in the audiology department of a large academic medical center. Patients qualified to be a part of the study if they had a disabling binaural hearing loss that was very likely to exist in the 2 years before audiometry. We excluded patients with mild or moderate conductive losses, including losses related to cerumen impaction. The only patients with conductive losses included in the study were those whose loss was explicitly noted in the audiology report to be of long duration. Any patients who reported a rapidly progressive sensorineural loss during the previous 2 years also were excluded.

We defined disabling hearing loss as binaural impairment sufficient to prevent complete recognition of spoken words in a medical office visit. We used a criterion based on the Speech Intelligibility Index (SII), which relates audiometric findings to the percentage of spoken words that individuals can recognize correctly at any given loudness.⁴ Importantly, the SII is a prediction of the best possible performance. Most people with hearing loss actually perform more poorly than the calculated value.⁵ We included patients for whom the SII predicted that their bilateral hearing thresholds would allow less than 90% word recognition at 50 dBHL (moderate speech).

Of all the charts for patients who received audiometry testing from July 18, 2007 to August 10, 2007, 680 were adults who had searchable EMRs, and of these, 254 (37%) met our hearing criterion. Our sample consisted of the first 100 patients (of the 254) who had recent, sufficient, and comprehensive EMR notes to review for documentation of hearing loss. We defined a recent note as one created no earlier than

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July 2005, within 2 years before the patients' audiometry. Pilot surveys looking at shorter time frames found relatively few patients with comprehensive visits documented in the EMR, prompting us to expand the time window to 2 years. We defined a sufficient and comprehensive EMR entry as the single most recent outpatient visit that had a physician note containing both the headings "History" (or "Review of Systems") and "Physical Exam." Notes did not always specify whether the physician was the patient's primary care physician, but we excluded notes from visits for specialty care focused on one issue, emergency department visits, and notes from inpatient stays. We also did not review history and physical examination reports recorded by physician assistants, nurses, or other nonphysicians. None of the 100 patients was deaf from birth, and all used oral language plus their residual hearing to communicate. Therefore, none of the survey patients would have benefited from the use of a sign language interpreter.

Chart Review

One author (CH) reviewed all 100 audiologic evaluations and the index EMR note, using an abstraction form to record age and sex, severity of the patients' loss, whether the patient had a hearing aid or cochlear implant, and the physician's documentation of hearing status. Any mention of hearing loss, hearing device, any in-office test, referral, or other notation that would imply hearing loss was counted as a documentation of loss. This was true regardless of which section of the report the notation was found. The reviewer assumed that the acronym "HEENT" (head, eyes, ears, neck, and throat) referred only to the appearance of the pinnae, auditory meati, and tympanic membranes. Thus, we interpreted the phrase "HEENT normal" as meaning "hearing loss not mentioned," rather than "hearing normal." The common statement "CNI-XII normal" was interpreted as indicating that the sensory function of CNVIII was normal. This abbreviation produced many of the notations of normal hearing that we report. The chart review also separately recorded whether patients had hearing aids at their audiology visit to allow us to perform an analysis of the group with hearing aids versus those without. We did not know whether patients wore their hearing aids during their physician visit unless that was documented in the EMR.

A subsample ($n=25$) of both the audiograms and EMR notes was reviewed by an independent observer who was blinded to the original chart review results. This blinded reviewer judged whether hearing loss was mentioned, not mentioned, or was noted to be normal by the same criteria described earlier. She also was asked to identify any case that may not have had substantial hearing loss at the time of the physician's note. Agreement between the independent observer and the original reviewer was 100% for the 25-patient subsample. The independent review of the audiograms also revealed that all 25 cases likely had hearing loss at the time of the physician note.

The study was approved by the Massachusetts Eye and Ear Infirmary Institutional Review Board [# 07-07-050X].

RESULTS

Table 1 shows findings from our review of histories and physicals of 100 sequential outpatients with disabling bilateral hearing loss. Only 28 records contained any mention of hearing

Table 1. Documentation of Hearing Loss

	Hearing loss documented (n=28)	Hearing loss not mentioned (n=36)	Reported as normal (n=36)	All cases (N=100)
Mean age (SD)	71.3 (15.1)	73.5 (12.2)	69.9 (13.3)	71.6 (13.4)
Female (%)	16 (57)	21 (58)	19 (54)	56
Hearing aid or implant (%)	13 (46)	14 (39)	7 (19)	34
HL on problem list	1	0	0	1
Referral for HL (%)	8 (28)	0	0	8

SD standard deviation

HL hearing loss

loss, and just one patient had "hearing loss" on her EMR problem list. Of the cases with hearing loss mentioned, eight referrals were made for this condition. Hearing loss was not mentioned in 36 records. For 36 records, our review found an indication of normal hearing (i.e., CNI-XII normal). In a separate analysis of the group with hearing loss mentioned versus the group reported as normal, patients with hearing aids were significantly more likely to be documented, and less likely to be reported normal than those without hearing aids (paired t test; $p=0.011$).

DISCUSSION

We found that significant bilateral hearing loss was not documented in the majority of comprehensive EMR visit notes reviewed in our study and that hearing was frequently reported as normal. This study suggests that bilateral hearing loss sufficient to prevent complete access to spoken medical information may frequently be underreported by physicians in patients' comprehensive histories and physicals.

Documentation of significant hearing loss in routine EMRs is important to the care of patients with this disability. It serves as a reminder to physicians and other clinicians of the potential need to accommodate patients' increased communication needs. It also would be an important first step to establish an electronic alert system that would remind the physician that a certain patient needs enhanced communication. Such alerts are already used as tools to remind physicians about patients' due dates for various screening and preventive services. An electronic alert could prompt clinicians to use communication strategies, such as adding time and precision to speech (as opposed to speaking more loudly) and providing a good view of the speaker's face in a quiet room.⁶ Having this knowledge of patients also raises the question about whether reimbursement policies should recognize the additional time demands of accommodating patients with hearing loss.

This brief report has important limitations. First, this study involved a single institution and was retrospective because the EMR was unavailable previously. Our design did not capture

whether the patients denied the loss or whether it was not explored. We also did not capture the precise referral path by which the patient presented for audiologic evaluation. This means that some of the physicians may have initiated or been aware of care being given for hearing loss, but this was not documented. These and other detailed issues of management and care delivery would benefit from future research.

Despite these limitations, this study is the first of its kind to document that patients with hearing loss significant enough to impede adequate communication in a medical encounter do not have this fact regularly documented and that physicians may not even recognize this disability among their patients. Clearly more research is needed to determine whether the lack of documentation actually reflects a lack of recognition of the problem. However, our findings do highlight the fact that better documentation of significant hearing loss in medical records—and recognition of this condition by primary care clinicians—are essential first steps toward improving communication with this growing population.

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REFERENCES

1. **Jackler RK.** A 73-year-old man with hearing loss. *JAMA*. 2003;289:1557–65.
2. **Iezzoni L, O'Day B, Kileen M, Harker H.** Communicating about health care: observations from persons who are Deaf or hard of hearing. *Ann Intern Med*. 2004;140:356–62.
3. **Walhagen M, Pettengill E.** Hearing impairment: significant but under-assessed in primary care settings. *J Gerontol Nur*. 2008;34:36–42.
4. American National Standards Institute. S3.5 Standard methods for calculation of the Speech Intelligibility Index. New York; 1997.
5. **Halpin C, Thornton A, Hou Z.** The Articulation Index in clinical diagnosis and hearing aid fitting. *Curr Sci*. 1996;4:325–34.
6. **Picheny M, Durlach N, Braida L.** Speaking clearly for the hard of hearing II: acoustic characteristics of clear and conversational speech. *J Sp Hrng Res*. 1986;29:434–46.