Effect of Hearing Enhancement on Mental Status Ratings in Geriatric Psychiatric Patients

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Objective: *This study looked at the impact of hearing deficits on the assessment of psychopathology in geriatric psychiatric patients.* *Method:* *Psychiatric functioning and speech discrimination were measured in 21 elderly psychiatric patients in a crossover design.* *Results:* *Patients displayed less psychopathology when tested wearing a functioning hearing aid.* *Conclusions:* *Gradual hearing loss may confound the assessment of psychopathology in geriatric psychiatric patients.*

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Debate over hearing loss and psychopathology dates back to the time of Kraepelin (1). There is little question that hearing impairment is associated with greater psychopathology, but most studies have been cross-sectional (2–4), limiting causal interpretations. Hearing impairment may well increase psychopathology; it has been shown to affect many aspects of functioning (5). However, an alternative and more parsimonious interpretation of this relationship is that hearing deficits artifactually increase the level of pathology observed. A patient who does not hear an examiner's question will give incorrect or bizarre responses. Although pathological, such responses say little about underlying psychopathology. We could find only one experimental study testing the hypothesis that hearing deficits could inflate measures of psychopathology (6). This study compared verbal and written testing procedures and found no differences. However, since many of the subjects in this study had visual problems as well as hearing problems, it is hard to draw a strong conclusion from this finding.

We suspected that undiagnosed hearing impairments affecting perception of speech sounds could inflate scores on standard measures of psychopathology. We tested chronically ill elderly patients with psychiatric diagnoses who had passed routine audiological screening tests. We hypothesized that unrecognized hearing impairment could be detected with more sensitive methods and that this hearing impairment would affect performance on mental status measures. We further hypothesized that using hearing aids would reduce the observed level of psychopathology.

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METHOD

Subjects were selected through a review of inpatient records. All had a currently stable axis I psychotic illness (diagnosed according to DSM-III-R); had no history of head trauma, chronic sinusitis, or ear infections; and had no family history of auditory dysfunction. Results of routine examinations by an audiologist performed within the past year were normal. Patients included in the study remained psychiatrically stable during the study (i.e., they required no change in their treatment). Thirty-four potential subjects were identified; 24 gave informed consent, and 21 completed the study (eight men and 13 women).

Seventeen of the 21 patients included in the study were diagnosed as having schizophrenia or schizoaffective disorder, and four were diagnosed as having a major affective disorder. Their mean age was 72.30 years (SD=5.13), their mean level of education was 9.94 years (SD=2.71), and their mean age at first admission was 29.94 years (SD=10.16); the mean length of hospitalization for the 21 patients exceeded 35 years.

Each patient was tested three times over 2 months in a crossover design, with a 2–5-week interval between testings to minimize recall. Baseline scores were obtained for all patients, followed by two additional testings—one in which the patient wore bilateral functioning hearing aids (hearing aid condition) and one in which the patient wore bilateral nonfunctioning hearing aids (placebo condition). The order of these last two testings was counterbalanced among patients, and the testing was done by a psychiatrist (J.L.K.) who was blind to the condition. To assure that the auditory canals were not occluded, moldable tubes were used to join the hearing aids to the auditory canals. Regardless of the condition, all patients were told that we wanted to ask them questions while they wore a hearing aid, and all were asked if the hearing aid was too loud. No patient indicated concern about the functioning of the hearing aid.

Psychiatric status was assessed by one of us (J.L.K.) with the Mini-Mental State (7), the Brief Psychiatric Rating Scale (BPRS) (8), and the Clinical Global Impression (CGI) (9). The Goldman-Fristoe-

TABLE 1. Impact of Hearing Aids on Hearing Acuity and Psychiatric Symptoms in 21 Elderly Psychiatric Inpatients

	Scores With and Without Hearing Aids						Analysis (df=1, 20)					
	Baseline		Placebo Hearing Aid		Functioning Hearing Aid		Overall		Baseline Versus Placebo[a]		Placebo Versus Hearing Aid[a]	
Measure	Mean	SD	Mean	SD	Mean	SD	F	p	t	p	t	p
Goldman-Fristoe-Woodcock Auditory Skills Test Battery	14.5	3.3	15.5	3.7	20.6	2.0	900.59	<0.001	2.42	<0.05	7.87	<0.001
BPRS total	38.5	7.7	39.9	6.7	31.2	6.4	792.20	<0.001	0.98	0.34	7.34	<0.001
CGI severity	4.00	0.63	3.95	0.92	3.24	0.83	589.38	<0.001	0.27	0.79	7.75	<0.001
Mini-Mental State total	18.4	4.4	17.3	4.4	24.0	4.2	548.69	<0.001	1.87	0.08	8.85	<0.001
Mini-Mental State time (seconds)	354	75	360	76	317	70	499.18	<0.001	1.12	0.28	4.69	<0.001

[a]Planned comparison. The critical value of p is 0.005 (10 comparisons) when a conservative Bonferroni correction is employed.

Woodcock Auditory Skills Test Battery (10) was used to assess speech discrimination. All patients passed a hearing examination at baseline that used tuning forks (128, 256, and 512 Hz) to test for auditory acuity, lateralized impairment (Weber Test), and conduction hearing impairment (Rinne Test) and an otoscope to rule out obstructions and occlusions (11).

Repeated measures analyses of variance, followed by planned comparisons, were conducted on each variable.

RESULTS

The hearing aids clearly improved speech acuity (table 1). There was a small placebo effect for speech acuity, but it fell short of Bonferroni-corrected significance. There was a strong speech acuity effect for the hearing aid. Similarly, large and statistically significant effects were observed on each of our other dependent measures (BPRS, CGI, and Mini-Mental State). The patients also took less time to complete the Mini-Mental State while they were wearing functioning hearing aids. The planned comparisons summarized in table 1 show that the effect was not just a placebo response. Clearly, patients appeared less impaired when they wore functioning hearing aids.

DISCUSSION

These data suggest that the observed level of psychopathology is overestimated in geriatric psychiatric patients when hearing impairment is not taken into account. The careful design of the study (essentially a double-blind procedure) makes it unlikely that the observed effect was artifactual. Of course, the number of patients included in this study was small, and replication would be prudent.

Gradual hearing loss is a natural part of the aging process (12) and is apparently more common in institutionalized patients (13). Our findings show that a mild hearing loss could easily lead to a substantial overestimation of psychopathology and possibly to unnecessary treatment. If anything, our data may underestimate the size of the effect because all of our patients had recently passed a standard audiology examination. Our patients' hearing deficits were usually subtle—typically not apparent to either the examiner or the patient—a finding consistent with other data (6). These subtle hearing deficits, however, had significant effects on standardized measures of psychopathology. Some of these patients may have been less disturbed than they appeared. Including hearing assessments at each pivotal psychiatric assessment would likely improve every aspect of treatment. The benefits may include cost savings as well as improved quality of life for patients.

Routine testing of the patient's hearing should be included in the psychiatric evaluation of patients at risk for hearing loss (primarily geriatric patients). Currently used procedures are not sufficient; our data show that tuning fork studies to 512 Hz do not pick up the hearing impairment detected by speech-discrimination procedures such as the Goldman-Fristoe-Woodcock Auditory Skills Test Battery. Although our data show that hearing loss can significantly increase the apparent level of psychopathology in geriatric patients, the data do not speak to the question of how this might affect patients. We suspect that a prospective, experimental study would demonstrate substantial impact of appropriate diagnosis and treatment of hearing impairment.

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