Hearing Loss Prevalence in the United States

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To the Editor

The prevalence of hearing loss in the U.S. population has been estimated from self-reported data[1] or in age-restricted cohorts[2]. These estimates may not accurately reflect the true burden of hearing loss in the U.S. We estimated the overall prevalence of audiometric hearing loss among all individuals in the U.S. 12 years using data from a nationally-representative dataset and with a definition of hearing loss recommended by the World Health Organization (WHO).

Methods

We analyzed data from the 2001–2008 cycles of the National Health and Nutritional Examination Surveys (NHANES), an ongoing epidemiological survey designed to assess the health and functional status of the civilian, non-institutionalized U.S. population[3]. Air-conduction pure tone audiometry was administered to all participants 12–19 years from 2005–8 (n=3143), a half sample of all participants 20–69 years from 2001–4 (n=3630), and all participants 70 years from 2005–6 (n=717). Audiometry was performed in a sound-attenuating booth according to established NHANES protocols. A speech-frequency pure-tone average (average of hearing thresholds at 0.5, 1, 2, and 4 kHz) of greater than 25 dB HL in both ears was defined as hearing loss per WHO criteria[4], and this is the level at which hearing loss begins to impair communication in daily life. Hearing loss prevalence was estimated by age decade, sex, and the three largest categories of race/ethnicity (non-Hispanic white [white], non-Hispanic black [black], and Mexican-American or other Hispanic [Hispanic]). There were insufficient individuals from other racial/ethnic groups to derive reliable age-stratified estimates. However, individuals from all racial and ethnic categories were included in estimates of overall prevalence. U.S. population counts were estimated using the midpoint of population totals in each cycle and averaged across combined cycles when appropriate. We accounted for the complex sampling design in all analyses by using sample weights according to National Center for Health Statistics (NCHS) guidelines.

Results

We estimate that 30.0 million or 12.7% of Americans 12 years had bilateral hearing loss from 2001–2008, and this estimate increases to 48.1 million or 20.3% when also including

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individuals with unilateral hearing loss (Table). Overall, the prevalence of hearing loss increases with every age decade. The prevalence of hearing loss is lower in women than in men and black versus white individuals across nearly all age decades.

Comment

For individuals 12 years and older in the U.S., nearly 1 in 8 has bilateral hearing loss, and nearly 1 in 5 has a unilateral or bilateral hearing loss. These are the first national estimates of hearing loss in the U.S. population based on audiometric data and a large, well-characterized representative sample. Previous national estimates based on self-reported data[1] and age-restricted cohorts[2] have been lower, in a range of 21–29 million. Other estimates of hearing loss prevalence have come from population-based cohorts[5] that are not representative of the U.S. population. While the overall risk of hearing loss may be decreasing over time[6, 7], the prevalence of hearing loss is expected to rise because of the aging of the population. Research is needed to understand the impact of hearing loss on cognition[8] and other functional domains and the role of aural rehabilitative strategies in possibly mitigating these effects.

Acknowledgments

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Table

Prevalence and Number of Individuals in the United States with Hearing Loss, NHANES 2001–2008, n = 7490

| Age, years | Prevalence of Hearing Loss[a] > 25dB (Bilateral) % (95% CI)[b] | | | | | | | Prevalence of Hearing Loss[a] > 25dB (Bilateral &Unilateral) % (95% CI)[b] | |
| | Sex | | Race/Ethnicity[c] | | | Total | | Total | |
	Female	Male	White	Black	Hispanic	Overall Prevalence	Number with Hearing Loss, millions	Overall Prevalence	Number with Hearing Loss, millions
12–19	0.42 (0–0.91)	0.20 (0–0.41)	0.26 (0–0.66)	0.48 (0.11–0.85)	0.43 (0.04–0.82)	0.31 (0.04–0.57)	0.10	2.3 (1.5–3.1)	0.76
20–29	0.35 (0–0.79)	0.48 (0–1.4)	0.43 (0–1.3)	0.63 (0–1.9)	0.35 (0–0.90)	0.42 (0–0.97)	0.16	3.2 (1.4–5.1)	1.2
30–39	0.79 (0–1.8)	2.5 (0.14–4.9)	1.8 (0–3.8)	1.7 (0–3.9)	1.6 (0.22–3.1)	1.6 (0.23–3.1)	0.68	5.4 (3.3–7.6)	2.3
40–49	4.5 (0.94–8.1)	8.7 (5.0–12.4)	7.4 (4.5–10.3)	1.3 (0–3.3)	7.3 (2.0–12.5)	6.5 (4.1–8.8)	2.8	12.9 (9.8–15.9)	5.6
50–59	6.1 (3.6–8.6)	20.3 (14.5–26.2)	14.5 (9.9–19.2)	7.1 (3.0–11.2)	13.8 (6.4–21.2)	13.1 (9.4–16.8)	4.4	28.5 (23.3–33.7)	9.6
60–69	16.8 (12.1–21.5)	39.2 (31.7–46.8)	26.6 (21.1–32.1)	15.9 (9.8–22.1)	28.9 (17.0–40.8)	26.8 (22.3–31.4)	5.7	44.9 (40.9–48.9)	9.5
70–79	48.5 (38.5–58.5)	63.4 (56.2–70.5)	55.8 (47.6–63.9)	39.0 (26.2–51.7)	66.8 (52.3–81.2)	55.1 (48.0–62.2)	8.8	68.1 (61.2–75.1)	10.8
80+	75.6 (69.7–81.5)	84.6 (79.0–90.3)	81.5 (78.5–84.5)	54.8 (40.6–69.0)	60.7 (34.8–86.6)	79.1 (76.0–82.2)	7.3	89.1 (86.1–92.0)	8.3
Estimated Total Number of Individuals with Hearing Loss, millions							30.0[d]		48.1

[a] Hearing defined by the average of hearing thresholds at 0.5, 1, 2, and 4 kHz tones presented by air-conduction.

[b] All values represent percent prevalence except for the column titled "Number with hearing loss, millions" which represents the number of prevalent cases.

[c] Prevalence estimates by race/ethnicity are only presented for the three largest racial/ethnic groups. Individuals from all racial/ethnic groups are included in the overall prevalence.

[d] Numbers do not sum to group total because of rounding.