



# Cochlear Implant Awareness in the United States: A National Survey of 15,138 Adults

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## ABSTRACT

Hearing loss is increasingly recognized as a chronic disease that warrants treatment. Depression, social isolation, loneliness, and poorer cognitive performance have all been linked to untreated and under-treated adult-onset hearing loss. A significant subset of the patient population with hearing loss is inadequately rehabilitated by hearing aids alone and may benefit from cochlear implantation. Yet, it is estimated that less than 10% of those who qualify have received implants to date. A national survey was conducted online in November and December 2021. Subjects were identified using Dynata panelists and river sampling. Enrollment occurred on a rolling basis. Upfront sample management techniques were used to control the distribution, balancing the respondent cohort to the 2018 U.S. Census on age, household income, sex, marital status, household size, race/ethnicity, and education. Among 15,138 adult respondents with a mean (SD) age of 51 (17) years (54% female), only 10% reported being very familiar with cochlear implants, and 31% of those with hearing difficulty reported that they have “never heard” of a cochlear implant. Females were statistically significantly more likely to report some degree of familiarity with cochlear implants than men (34 vs. 26%;  $p < 0.01$ ). The greatest familiarity with cochlear implants was observed among those aged 35 to 44 years (18% reporting “very familiar”), whereas only 9% of those aged 65 to 74, 10% aged 75 to 84, and 8%  $\geq 85$  reported being very familiar ( $p < 0.01$ ). Those identifying as White/Caucasian were sta-

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tistically significantly more likely to report familiarity with cochlear implants than those identifying as Black/African American and Hispanic/Latino/Spanish (33 vs. 56 vs. 50% responding that they had “never heard” of cochlear implants;  $p < 0.01$ ). Among adults with hearing difficulty, nearly 80% report having never talked with a medical or hearing care professional about cochlear implants. Limited cochlear implant awareness likely influences its widespread underutilization across the United States. Sex, age, and race disparities compound these issues among men, the Medicare-aged population, and those identifying as Black/African American and Hispanic/Latino/Spanish.

**KEYWORDS:** hearing loss, cochlear implant, adults, awareness, utilization, population, race, gender, age, disparity

In recent years, hearing loss has received heightened attention secondary to the growing appreciation for its long-term sequelae, including depression, social isolation, loneliness, a host of pragmatic safety concerns, and poorer cognitive performance.<sup>1-4</sup> What is more, hearing loss is very common: the Global Burden of Disease implicates hearing loss as the third largest contributor to years lived with disability worldwide.<sup>5</sup> Underscored by the aging demographic in the West, it is estimated that almost 2.5 billion people will be suffering from some degree of hearing loss by the year 2050.<sup>6</sup>

Among the greater population with hearing loss exists a subset of patients with significant hearing disability that is inadequately rehabilitated by hearing aids alone. Within this subset, the only effective means of rehabilitating their severity of hearing loss is cochlear implantation.<sup>7</sup> Importantly, because hearing loss is exceedingly common, even this small proportion of patients becomes significant: in the United States, it is estimated that 1.2 million adults would benefit from hearing loss rehabilitation through cochlear implantation but have not yet received an implant.<sup>8</sup> Moreover, most modern implant recipients harbor years of living with inadequately rehabilitated hearing loss before receiving their implant.<sup>8,9</sup> To this end, substantial concern exists over the widespread underutilization of cochlear implants globally, with estimates from the United States suggesting that less than 10% of qualifying patients have received implants to date.<sup>10</sup>

The combination of negative health sequelae associated with inadequately rehabilitat-

ed hearing loss and evidence of widespread underutilization of cochlear implants render efforts toward improving patient literacy and access paramount. For this reason, the current study was undertaken as a part of the larger MarkeTrak national survey to better characterize existing literacy surrounding cochlear implants among the general adult population in the United States.

## METHODS

An exhaustive description of the survey methodology can be found earlier in the same *Seminars in Hearing* issue, but briefly for the purposes of the current work: a national survey was conducted online in November and December 2021, using Dynata sample sources (panelists and river sampling respondents). Fielding occurred on a rolling basis during this period, and upfront sample management techniques were used to control the distribution of respondents across key variables to minimize the need for back-end weighting. Sample management techniques included setting quotas using 2018 U.S. Census estimates for each region within the country on age, household income, gender, marital status, household size, race/ethnicity, and education (in total and within each region). The final dataset was then weighted to align with 2018 U.S. Census data on region, age, gender, and income. Weighting was done at the household head level to align data with adult household heads within the United States. Weighting was secondarily performed at the individual

level (for all household members including children) to align with census estimates for all individuals within the United States. Statistical methods included summarizing continuous variables with means and standard deviations (SDs). Comparisons among respondents' answers were assessed using an independent sample *t*-test. All tests were two-sided and *p*-values less than 0.05 were considered statistically significant.

## RESULTS

A total of 15,138 adults responded to the survey. The mean age (SD) of respondents was 51 (17) years with 45% of respondents identifying as male, 54% as female, and less than 1% as gender diverse (Table 1). A total of 74% of respondents identified as White/Caucasian, 14% as Black/African American, 13% as Hispanic/Latino/Spanish, 5% as Asian, 2% as American Indian or Alaska Native, and 0.8% as other.

**Table 1 Demographic Features of Respondent Cohort Balanced to 2018 U.S. Census (N = 15,138)**

Feature <sup>a</sup>	
Age in years	51 (17)
Female	8,235 (54)
Age group	
18–24	742 (5)
25–34	2,405 (16)
35–44	2,573 (17)
45–54	2,740 (18)
55–64	2,846 (19)
65–74	2,195 (15)
75–84	1,484 (10)
85 or older	151 (1)
American Indian or Alaska Native	242 (2)
Asian	802 (5)
Black/African American	2,104 (14)
Hispanic/Latino/Spanish	1,998 (13)
White/Caucasian	11,142 (74)
Other	121 (1)
Self-reported hearing difficulty	1,871 (12)

<sup>a</sup>Age is summarized with mean (SD), otherwise all results are reported as n (%). Patients could identify as more than one racial group; so the total exceeds 100%.

Across all 15,138 respondents, only 12% reported being very familiar with cochlear implants. Males were statistically significantly more likely to report that they had “never heard” of cochlear implants than females (41 vs. 36%;  $p < 0.01$ ; Table 2). The greatest familiarity with cochlear implants was observed among those aged 35 to 44 years (18% reporting “very familiar”), whereas only 9% of those aged 65 to 74, 10% aged 75 to 84, and 8% aged  $\geq 85$  reported being very familiar ( $p < 0.01$ ). Those identifying as White/Caucasian were statistically significantly more likely to report familiarity with cochlear implants, with only 33% of White/Caucasian respondents reporting that they had never heard of cochlear implants compared with 56% of those identifying as Black/African American, 50% of those identifying as Hispanic/Latino/Spanish, 46% of those identifying as Asian, and 40% of those identifying as American Indian or Alaska Native ( $p < 0.01$ ).

Among 1,871 (12%) respondents who reported difficulty hearing, 77% reported that a medical or hearing care professional had never told them about cochlear implants (Fig. 1). Women were significantly more likely to report not having spoken with a medical or hearing care professional about cochlear implants compared with men (81 vs. 74%;  $p < 0.01$ ). Older age was also associated with not being counseled on cochlear implants, with at least 80% of those aged 45 to 84 reporting that they had not talked to a medical or hearing care professional about cochlear implants ( $p < 0.01$ ). Those aged 65 to 84 years reported the highest rate of not having talked to a medical or hearing care professional (88%;  $p < 0.01$ ). Black/African American respondents with hearing difficulty reported the highest rate of having been counseled on cochlear implants (30% said “yes”), followed by American Indian or Alaska Native (28%), Hispanic/Latino/Spanish (20%), and White/Caucasian (15%;  $p < 0.01$ ).

## DISCUSSION

Hearing loss is being increasingly recognized as a chronic disease that warrants treatment. A significant subset of the patient population

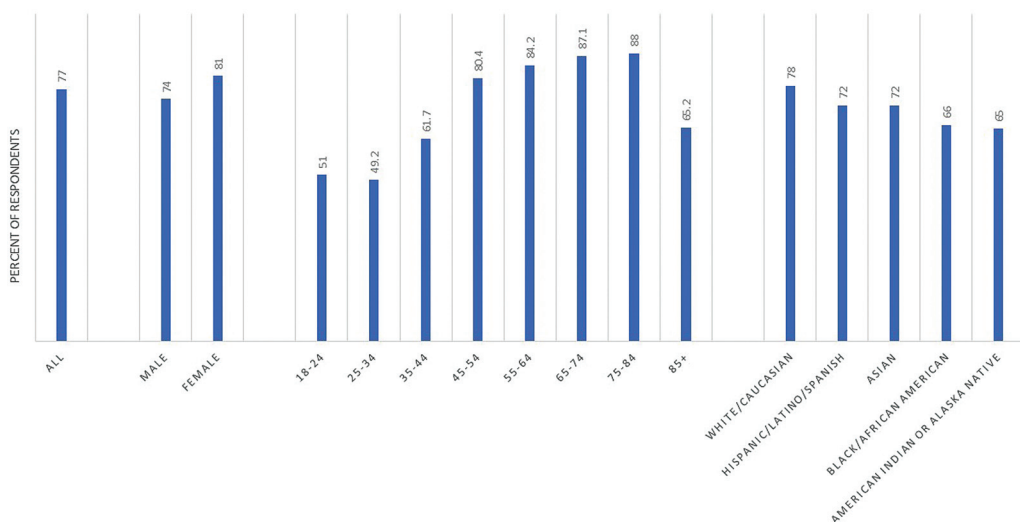
**Table 2 Familiarity with Cochlear Implants by Sex, Age Group, and Race Responding to the Question, "Do you know what a cochlear implant is?" (N = 15,138)**

	No, never heard of it	Yes, somewhat familiar	Yes, very familiar
<b>Sex</b>			
Male	48.9%	42.0%	45.7%
Female	50.9%	57.8%	53.9%
<b>Age group</b>			
18–24	5.6%	4.0%	6.0%
25–34	17.9%	12.8%	19.9%
35–44	17.8%	14.1%	24.4%
45–54	20.6%	16.6%	16.7%
55–64	19.3%	19.8%	15.0%
65–74	11.5%	18.3%	9.9%
75–84	6.6%	13.1%	7.4%
85 or older	0.6%	1.3%	0.6%
<b>Racial group<sup>a</sup></b>			
American Indian or Alaska Native	1.7%	1.6%	1.6%
Asian	6.3%	4.6%	4.9%
Black/African American	20.2%	9.7%	10.6%
Hispanic/Latino/Spanish	16.8%	10.2%	13.6%
White/Caucasian	62.6%	81.1%	78.2%
Other	0.9%	0.7%	1.0%

<sup>a</sup>Patients could identify as more than one racial group; so the total exceeds 100%.

with hearing loss cannot be adequately rehabilitated with hearing aids alone and may benefit from cochlear implantation.<sup>7</sup> Unfortunately, research shows that cochlear implants are widely

underutilized globally, with estimates from the United States suggesting that less than 10% of those with qualifying hearing loss have received cochlear implants to date.<sup>10</sup> Multiple factors



**Figure 1** Proportion reporting that they had never spoken to a medical or hearing care professional about cochlear implants among the 1,871 (12%) respondents who reported difficulty hearing. Reported rates differed significantly by sex, age group, and racial group (all  $p < 0.01$ ).

have been identified as contributory in the underutilization of cochlear implants, with questions surrounding patient awareness comprising a major concern.<sup>11,12</sup> For this reason, a national survey of 15,138 adults balanced to the 2018 U.S. census, composed of respondents with and without hearing loss, were queried about their knowledge surrounding cochlear implants as a part of the larger MarkeTrak survey in the current study.

Data from this national survey indicate that the minority of U.S. adults have significant familiarity with cochlear implants. Even among patients with hearing difficulty, more than 30% report having “never heard” of cochlear implants—a finding that was significantly more common among minority racial groups. Admittedly, this observation is not surprising in light of the finding that almost 80% of those with hearing difficulty report having never talked about cochlear implants with a medical or hearing care professional. These data are corroborated by previous work, where only 5% of patients who ultimately received cochlear implants reported receiving their initial referral from their primary care provider.<sup>13</sup> Furthermore, the specific inclusion of hearing care professionals in the question stem is significant, as previous work has also demonstrated that patients receive little counseling on cochlear implantation in many general audiology and otolaryngology practices.<sup>12,13</sup>

These observations parallel the overarching limited literacy and awareness surrounding hearing loss in general throughout the United States. A recent national survey of 1,250 adults in the United States showed that 93% of adults could correctly identify “normal” vision cutoffs and 85% “normal” blood pressure ranges, while only 9% were able to identify what constitutes a “normal” or “average” range for hearing.<sup>14</sup> Respondents were over twice as likely to bring their pet to the vet than have their hearing checked. Compounding the observations from the current study, less than one-fourth of adults report strong awareness of hearing loss’s connection to depression, employability and income, fall risk, cognitive decline, and type 2 diabetes.<sup>14</sup> In these ways, not only do patients have limited awareness surrounding cochlear implantation as a treatment option, they have

little motivation to seek out this knowledge as there is limited literacy surrounding the long-term health sequelae associated with adult-onset hearing loss.<sup>14</sup>

The present work also identified several areas of sex, age, and racial disparities regarding awareness of cochlear implants. Notably, those of Medicare-age exhibited some of the lowest rates of familiarity with cochlear implants despite this population representing the largest subset of the adult population in the United States who qualifies for cochlear implantation.<sup>7,15</sup> Moreover, this subset of the population also faces unique barriers to implantation regarding overly stringent Medicare qualification requirements and are at a higher risk of other sensory impairments, including vision.<sup>8,9,11</sup> These baseline challenges were further complicated by the global COVID-19 pandemic, where older adults witnessed some of the greatest setbacks in cochlear implant hearing health care. Specifically, Medicare-aged adults experienced a 15% drop in cochlear implantation rates, and those  $\geq 80$  years experienced a 25% drop, resulting in a 3-year setback in annual cochlear implantation rates.<sup>16</sup>

The current national survey also highlighted how racial minority groups report decreased awareness surrounding cochlear implants compared with those identifying as White. These findings are corroborated by prior work that has demonstrated non-Whites are half as likely to ultimately undergo cochlear implantation despite qualifying.<sup>17</sup> Insurance factors also compound these observations, with only approximately 60% of states currently offering Medicaid coverage for cochlear implantation.<sup>18,19</sup> These findings parallel disparities noted in other related medical fields. For instance, in population-based studies on cataract surgery in the United States, Blacks are significantly less likely to undergo cataract surgery within 5 years of diagnosis when compared with Whites.<sup>20</sup> Interestingly, the current study paradoxically also found that Black/African American respondents with hearing difficulty reported the highest rate of having been counseled on cochlear implants. Despite this finding, the current study in combination with previous literature nonetheless suggests that racial minorities likely experience significantly decreased

access to cochlear implants compared with Whites.

There are limitations to the current work. Most notably, survey-based studies are inherently prone to recall bias. As it extends to the current work, questions regarding the presence of hearing difficulty as well as whether or not a medical or hearing care professional ever previously mentioned cochlear implants could be influenced by recent experiences causing respondents to answer one way or another. However, given the potential for this to go both ways over a large respondent sample (i.e., patients forgetting that a provider mentioned cochlear implants years ago vs. a patient reading a recent news article about cochlear implants and attributing this familiarity to the general health visit they had last week), it is unlikely that this bias significantly influences the results herein.

## CONCLUSION

Limited cochlear implant awareness influences the widespread underutilization across the United States. Sex, age, and race disparities compound these issues among men, the Medicare-aged population, and those identifying as Hispanic/Latino/Spanish and Black/African American.

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## CONFLICT OF INTEREST

No authors have relevant conflict of interest to disclose.

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