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Why Do Candidates Forgo Cochlear Implantation?

Joshua J. Sturm, MD, PhD; Gabriel Brandner, BS; Cheng Ma, MD; Kara C. Schvartz-Leyzac, AuD, PhD; Judy R. Dubno, PhD; Theodore R. McRackan, MD, MSCR

Objective: Identify barriers and facilitating factors in cochlear implant (CI) utilization by comparing functional measures between CI candidates who undergo or forgo implantation.

Methods: Forty-three participants were separated into two groups: (1) 28 participants who underwent CI and (2) 15 participants who elected not to proceed with CI despite meeting eligibility criteria (no-CI). Prior to implantation, all participants completed the CI Quality of Life (CIQOL)-35 Profile and CIQOL-Expectations instrument. They were also surveyed on factors contributing to their decision to either undergo or forgo CI. Word and speech recognition were determined using the Consonant-Nucleus-Consonant (CNC) and the AzBio tests, respectively.

Results: CIQOL-Expectations scores were indistinguishable between groups, but there were substantial differences in baseline CIQOL-35 Profile scores. Compared to the CI group, the no-CI group exhibited higher pre-CI scores in the Emotional (Cohen's d [95% CI] = 0.8 [0.1, 1.5]) and Entertainment (Cohen's d [95% CI] = 0.8 [0.1, 1.5]) domains. Survey data revealed that the most commonly reported barriers to pursuing CI in the no-CI cohort were fear of surgical complications (85%), cost associated with implantation (85%), and perception that hearing was not poor enough for CI surgery (85%).

Conclusions and Relevance: The results of this study indicate that functional outcome expectations are similar between candidates who elect to receive or forgo CI, yet those who forgo CI have higher baseline CI-specific QOL abilities.

Key Words: cochlear implant, hearing loss, quality of life.

Level of Evidence: 4

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INTRODUCTION

Cochlear implants (CI) are a safe and effective neural prosthesis for individuals with sensorineural hearing loss who receive limited benefit from hearing amplification. Beyond providing substantial benefits in terms of speech recognition abilities, CIs have also been shown to improve emotional wellbeing, social engagement, and quality of life.[1] However, despite these benefits, it is estimated that only 6%–10% of potential CI candidates are being evaluated for implantation.[2–4] In addition to health care system-specific factors such as a lack of awareness and education amongst providers with regard to CI candidacy, patient-specific factors likely also play a major role in determining CI utilization. A better understanding of these factors is essential to meeting the needs of the hearing impaired at a societal level.[5]

It is well established that patient-specific factors can have a substantial impact on whether hearing-impaired individuals seek medical care for their hearing loss. For example, minimalization or denial of hearing loss, stigma, and ageism are all barriers to hearing aid use.[6–8] By contrast, patients who utilize hearing aids tend to perceive their hearing loss as being severe and as having a negative impact on their daily life.[9,10] These individuals also tend to believe that hearing aids have beneficial effects.[11]

In the case of cochlear implantation, fears of surgical complications, loss of residual hearing, acquired balance problems, and insurance concerns have all been reported as patient barriers during CI evaluation.[12–14] Baseline hearing acuity may also play a role because patients who elect to receive a CI tend to exhibit higher baseline pure-tone averages (PTA), lower consonant-nucleus-consonant (CNC) word scores, and lower AzBio sentence scores compared to eligible patients who forgo implantation.[2] However, given that clinical measures of speech recognition are known to be poor predictors of patient-reported real-world functional communication abilities, these factors alone likely fail to explain low CI utilization.[1,15–16]

A major outstanding question is how the disease-specific quality of life may relate to CI utilization. The goal of the present study was to compare baseline self-reported functional abilities in CI candidates who elect to undergo cochlear implantation or to forgo it. To accomplish this, we utilized two validated patient-reported outcome measures (PROM), the CI Quality of Life Profile (CIQOL-35 Profile) instrument and the CI Quality of Life Expectations (CIQOL-Expectations) instrument and compared scores between eligible CI candidates who did or did not undergo implantation.[17,18]

From the Department of Otolaryngology – Head and Neck Surgery (J.J.S., G.B., K.C.S.-L., J.R.D., T.R.M.), Medical University of South Carolina, Charleston, South Carolina, USA; Department of Otolaryngology – Head and Neck Surgery (C.M.), Penn State College of Medicine, Hershey, Pennsylvania, USA.

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Send correspondence to Theodore R. McRackan, MD, MSCR, Department of Otolaryngology – Head and Neck Surgery, Medical University of South Carolina, Charleston, SC 29425, USA.

Email: mcrackan@musc.edu

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METHODS

Patients

This study was approved by our University's Institutional Review Board, and informed consent was not required. We contacted 105 patients for potential participants who were identified from a prospectively maintained database for adult patients undergoing CI evaluations for bilateral sensorineural hearing loss at our institution between January 2020 and January 2021. This date range was chosen due to the availability of data from CIQOL-Expectations and CIQOL-35 Profile instruments being limited to patients undergoing implant evaluation after 2019. Inclusion criteria were documented history of post-lingual onset of hearing loss, age of 18 years or older at the time of implantation, and available preoperative aided CNC and AzBio scores. Exclusion criteria were revision CI and implantation for single-sided deafness.

Contacted patients were separated into two cohorts: (1) patients that met audiological criteria for CI and elected to proceed with CI surgery (CI) and (2) patients who met the criteria but who elected to forgo surgery (no-CI). Of the total 105 patients contacted who qualified for CI, 43 total patients were recruited for participation (28/54 CI patients and 15/51 no-CI patients).

Data Acquisition

The following data were obtained from our adult cochlear implantation patient database: pure tone averages (PTA) and speech recognition scores measured separately for each ear. PTA were measured under both best-aided and earphone conditions. Speech recognition scores included CNC words and AzBio sentences in quiet (AZBio Quiet). Speech recognition scores were measured using best-aided condition with hearing aids (personal or clinic-owned hearing aids) fitted to National Acoustics Laboratory-Revised Linear (NAL-RL) targets.[19]

Speech recognition testing was performed in a sound-treated room in the sound field with speech presented at 60 dB SPL (0 degrees azimuth).

All patients completed in-house audiograms and speech recognition testing as part of their CI evaluations. Standard speech recognition testing was performed using CNC word recognition and AzBio sentence recognition scores. As part of the study, we confirmed that participants who decided not to pursue surgery with us did not decide to instead pursue the surgery elsewhere.

The following data were obtained from a demographic questionnaire: age, sex, combined annual household income, insurance, highest level of education, employment status, and residential setting. Patients also completed an internally developed hearing information survey that captured general information about active hearing aid use prior to implant evaluation and CI educational resources utilized during implant evaluation.

An internally developed CI decision survey was used to capture both facilitating factors and barriers to CI utilization. Statements regarding facilitating factors and barriers to CI uptake were developed from a literature search of several pertinent studies.[14,20] We selected 22 facilitating and 19 barrier statements. For assessment, patients were asked to rate on a Likert scale (0 – "Not at all"; 4 – "Very much") the degree to which each factor contributed to their decision about cochlear implantation. For each statement, the frequencies of non-zero (1–4) responses were calculated for the corresponding cohort (e.g., barrier statements for the no-CI group and facilitating statements for the CI group). For each group of statements, a "common" contributing factor was defined by >80% non-zero responses in that cohort. Additionally, participants were provided the ability to enter free text responses regarding specific concerns about surgical complications.

Self-reported functional abilities were assessed using the CI Quality of Life Profile (CIQOL-35 Profile) and CI Quality of Life Expectations (CIQOL-Expectations) instruments.[17,18] The CIQOL-35 Profile is an established and psychometrically verified instrument that measures domain-specific QOL across 6 domains (communication, emotional, entertainment, environmental, listening effort, and social) and a global score.[20] The CIQOL-Expectations instrument is a modification of the CIQOL-35 that was previously developed and psychometrically verified to measure patients' expected CI outcomes prior to CI surgery across the same domains.[18]

Statistical Analysis

Analyses were performed using SPSS version 27.0 (IBM Corp., Armonk, NY). Nominal variables were summarized by frequency and percentage. Comparisons were performed using Chi-square analyses and Fischer Exact tests where statistically appropriate. Continuous variables were tested for normal distributions as determined by Kolmogorov–Smirnov tests. Continuous variables were summarized by mean (standard deviation, SD) where appropriate. Effect sizes (Cohen d) were used to measure the strength of associations and expressed with 95% confidence intervals. Cohen d was calculated by dividing the mean difference by the pooled standard deviations according to standard practice. An effect size of 0.2–0.49 was considered small, 0.5–0.79 medium, 0.8–1.29 large, and above 1.3 very large.[21] Given the hypothesis-generating nature of this study (i.e., lacking power analysis), no specific statistical significance level was set.

RESULTS

Demographics

Of 105 patients contacted, 43 responded (41.0% response rate), with the response rate being lower for the no-CI group (15/51) compared to the CI group (28/54) (no-CI = 29.4% vs. CI = 51.9). The demographic characteristics of the 43 patients enrolled in the study are detailed in Table I. Several demographic characteristics were similar between groups, including mean age at CI evaluation and household income and insurance levels (private vs. public) (Table I). The overall sex (male-to-female) balance was 51.2% male and 48.8% female, but there were relatively more females in the no-CI group (n = 10/15, 66.7% female) compared to the CI group (n = 11/28, 39.3% female) (Table I). The proportion of currently employed patients in the no-CI group was higher compared to the CI group (no-CI = 60% vs. CI = 25%, p = 0.02, n = 43, Chi-square test) (Table I). Additionally, self-reported residential setting was predominately rural in the no-CI group (8/15, 53.3%), whereas it was primarily suburban in the CI group (18/28, 64.3%) (Table I). Thus, whereas both groups were of similar age and income level, patients in the no-CI group were more likely to be currently employed and to live in rural areas.

Pure Tone and Speech Audiometry

Audiological data for PTA and speech recognition scores in each study group are displayed in Table II.

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TABLE I.
Patient Demographics.

Variable	n_{Total} (%)	$n_{No\text{-}CI}$ (%)	n_{CI} (%)
Age (years)	61.9 (± 18.0)	59.1 (± 17.7)	63.5 (± 18.3)
Sex			
Male	22 (51.2)	5 (33.3)	17 (60.7)
Female	21 (48.8)	10 (66.7)	11 (39.3)
Combined annual household income			
$0–$20,000	5 (11.6)	1 (6.7)	4 (14.3)
$20,001–$50,000	10 (23.3)	3 (20.0)	7 (25.0)
$50,001–$80,000	14 (32.6)	6 (40.0)	8 (28.6)
$80,001–$110,000	4 (9.3)	3 (20.0)	1 (3.6)
>$110,000	7 (16.3)	1 (6.7)	6 (21.4)
Unknown/not reported	3 (7.0)	1 (6.7)	2 (7.1)
Insurance			
Private	18 (41.9)	8 (53.3)	10 (35.7)
Public	24 (55.8)	7 (46.7)	17 (60.7)
Unknown	1 (2.3)	0 (0.0)	1 (3.6)
Highest level of education			
Some high school (no diploma)	1 (2.3)	1 (2.3)	0 (0.0)
High school graduate or equivalent	7 (16.3)	3 (20.0)	4 (14.3)
Some college/trade/technical/vocational training	9 (20.9)	2 (13.3)	7 (25.0)
Associate's/Bachelor's degree	13 (30.2)	4 (26.7)	9 (32.2)
Master's degree or higher	13 (30.2)	5 (33.4)	8 (28.6)
Employment status			
Employed	16 (27.2)	9 (60.0)	7 (25.0)
Unemployed	3 (7.0)	1 (6.7)	2 (7.1)
Retired	18 (41.9)	3 (20.0)	15 (53.6)
Disabled	6 (14.0)	2 (13.3)	4 (14.3)
Residential setting			
Urban	6 (14.0)	2 (13.3)	4 (14.3)
Suburban	23 (53.5)	5 (33.3)	18 (64.3)
Rural	14 (32.6)	8 (53.3)	6 (21.4)

Overall, patients who chose not to proceed with cochlear implantation had somewhat better PTAs and sentence recognition scores compared to patients that proceeded with implantation (Table II). Compared to the no-CI group, both earphones and aided PTAs were higher in the CI group for the worse and better hearing ear (Table III). Further, AzBio Quiet scores were lower in the better ear condition of the CI group compared to the no-CI group (Table II). Thus, the CI group had somewhat poorer audiometrically-defined hearing abilities compared to the no-CI group.

TABLE III.
CIQOL-Expectations Scores.

Domain	$\bar{x}$ (± SD) No-CI	$\bar{x}$ (± SD) CI	Cohen's *d* (95% CI)
Global	54.04 (± 6.21)	56.64 (± 11.64)	−0.25 (−0.93 to 0.43)
Communication	57.37 (± 8.96)	57.20 (± 16.60)	0.01 (−0.66 to 0.69)
Emotional	60.84 (± 12.61)	60.90 (± 17.65)	−0.00 (−0.68 to 0.67)
Entertainment	54.05 (± 18.03)	62.36 (± 18.56)	−0.45 (−1.14 to 0.24)
Environment	59.85 (± 9.14)	66.35 (± 20.63)	−0.36 (−1.04 to 0.33)
Listening effort	47.63 (± 10.39)	48.65 (± 16.81)	−0.07 (−0.74 to 0.61)
Social	65.64 (± 19.13)	65.55 (± 19.61)	0.00 (−0.67 to 0.68)

Cochlear Implant Quality of Life

We found no substantial differences between the CI and no-CI cohorts in terms of functional outcome expectations using the CIQOL-Expectations instrument (Table III). We then compared baseline CIQOL scores between the CI and no-CI cohorts using the CIQOL-35 Profile instrument (Table IV). We found substantial differences between the CI and no-CI groups in terms of CIQOL-35 Profile scores (Table IV). Compared to the CI group, the no-CI group exhibited notably higher emotional (no-CI = 58.7 ± 11.3 vs. CI = 44.5 ± 19.4, Cohen's *d* [95% CI] = 0.8 [0.1, 1.5]) and entertainment (no-CI = 53.5 ± 20.1 vs. CI = 40.2 ± 14.4, Cohen's *d* [95% CI] = 0.8 [0.1, 1.5]) domain scores (Table IV). The no-CI group also appeared to exhibit higher social domain scores (no-CI = 57.3 ± 17.3 vs. CI = 46.7 ± 18.7, Cohen's *d* [95% CI] = 0.58 [−0.12, 1.27]). Thus, whereas patients in both groups exhibited similar functional outcome expectations with a CI, patients that decided against CI surgery showed higher self-reported baseline emotional, entertainment, and social abilities.

TABLE II.
Pure-Tone Averages and Speech Recognition Scores.

Assessment	No-CI (± SD)	CI (± SD)	Cohen's *d* (95% CI)
Worse ear PTA (earphone)	78.33 (± 20.87)	83.04 (± 19.30)	−0.24 (−0.87 to 0.39)
Worse ear PTA (aided)	40.34 (± 11.08)	48.33 (± 15.77)	−0.55 (−1.29 to 0.20)
Worse ear CNC	15.23 (± 20.71)	13.17 (± 13.41)	0.13 (−0.55 to 0.80)
Worse ear AzBio Quiet	9.67 (± 14.5)	20.74 (± 26.76)	−0.45 (−1.21 to 0.31)
Better ear PTA (earphone)	58.72 (± 31.20)	68.62 (± 16.33)	−0.44 (−1.12 to 0.26)
Better ear PTA (aided)	31.53 (± 14.42)	38.56 (± 7.53)	−0.68 (−1.39 to 0.05)
Better ear CNC	46.00 (± 28.07)	35.62 (± 21.42)	0.44 (−0.27 to 1.15)
Better ear AzBio Quiet	70.88 (± 34.00)	48.69 (± 25.81)	0.80 (−0.24 to 1.61)

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TABLE IV.
CIQOL-35 Profiles Scores.

Domain	$\bar{x}$ (± SD) No-CI	$\bar{x}$ (± SD) CI	Cohen's *d* (95% CI)
Global	43.18 (± 8.33)	38.07 (± 14.27)	0.40 (−0.29 to 1.08)
Communication	37.90 (± 9.06)	33.10 (± 16.94)	0.32 (−0.36 to 1.00)
Emotional	58.73 (± 11.25)	44.50 (± 19.43)	0.82 (0.11 to 1.51)
Entertainment	53.46 (± 20.95)	40.18 (± 14.38)	0.80 (0.10 to 1.50)
Environment	49.00 (± 13.25)	40.50 (± 24.64)	0.39 (−0.30 to 1.07)
Listening effort	29.59 (± 11.11)	23.83 (± 17.39)	0.36 (−0.32 to 1.04)
Social	57.28 (± 17.31)	46.72 (± 18.66)	0.58 (−0.12 to 1.27)

Cochlear Implant Decision Survey

We then evaluated the relative frequencies of various patient-reported barriers to proceeding with cochlear implantation in each group using our CI decision survey. Individuals who underwent CI were more commonly concerned about acquiring only small improvements in communication abilities (no-CI = 15.4% vs. CI = 42.9%), whereas both groups were commonly concerned about poor sound quality and hearing ability. Less common concerns included pain, vertigo, and balance problems.

We next explored the relevance of 19 putative barrier statements in preventing patients in the no-CI group from undergoing cochlear implantation, as well as 22 putative facilitating statements in driving patients from the CI group to undergo implantation (Table V). Of the 19 barrier statements presented to patients in the no-CI group, three were found to be *common* (defined as >80% of patient's reporting non-zero responses, see Section 2): (1) fear of surgical complications (mean rating [0–4] = 2.15 ± 1.46), (2) costs of CI surgery (mean rating [0–4] = 2.15 ± 1.41), and (3) self-perception that hearing was not poor enough to warrant a CI (mean rating [0–4] = 2.00 ± 1.23) (Table V). As illustrated in Table V, of the 22 facilitating statements presented to the CI group, many were found to be *common*. Those that had particularly high mean ratings included (1) the desire for a better hearing to improve communication (mean rating [0–4] = 3.79 ± 0.42), (2) the belief that a CI will improve the quality of hearing (mean rating [0–4] = 3.75 ± 0.52), (3) the belief that a CI will improve the ability to interact socially (mean rating [0–4] = 3.43 ± 0.88), and (4) trust in the CI team to deliver a positive result (mean rating [0–4] = 3.57 ± 0.63).

DISCUSSION

The decision to pursue cochlear implantation is a complex and highly individualized one. Current levels of CI utilization are low among eligible adults, indicating that significant barriers to implantation exist. Previous

TABLE V.
Barriers and Facilitating Factors to Cochlear Implantation.

	No Surgery (%, *n*)	Surgery (%, *n*)	Mean (± SD)	Cohen's *d* (95% CI)
Barrier				
Potential complications from cochlear implant surgery	85% (11)		2.15 (±1.46)	0.92 (0.25–1.56)
Cost of cochlear implant surgery	85% (11)		2.15 (±1.41)	0.92 (0.25–1.56)
I did not think that my hearing was poor enough to get a cochlear implant	85% (11)		2.00 (±1.23)	0.92 (0.25–1.56)
Facilitator				
Improve my ability to interact socially		96% (27)	3.43 (± 0.88)	2.46 (1.70–3.20)
Desire to reduce social isolation		93% (26)	2.86 (± 1.21)	1.63 (1.06–2.20)
Desire for better hearing to improve communication (e.g., talking on the phone, conversations in noisy environments)		100% (28)	3.79 (± 0.42)	
Desire to gain/maintain independence		89% (25)	2.39 (± 1.37)	1.25 (0.74–1.74)
Frustration with my hearing loss and its impact on my mental health		89% (25)	2.79 (± 1.37)	1.25 (0.74–1.74)
Frustration with my hearing loss and its impact on my relationships with others		93% (26)	3.00 (± 1.25)	1.63 (1.06–2.20)
Hearing aids were no longer providing benefit		89% (25)	3.04 (± 1.29)	1.25 (0.744–1.74)
Increased listening effort during conversations		100% (28)	3.57 (± 0.63)	
Hearing loss impacted my ability to perform daily tasks		86% (24)	2.29 (± 1.36)	1.00 (0.54–1.45)
Trust in the cochlear implant team to deliver a positive result		100% (28)	3.57 (± 0.63)	
Confidence in my ability to operate a cochlear implant		93% (26)	3.21 (± 1.17)	1.63 (1.06–2.20)
My health care provider was supportive of cochlear implants		89% (25)	3.07 (± 1.30)	1.25 (0.74–1.74)
My health care provider was knowledgeable about cochlear implants		89% (25)	2.82 (± 1.28)	1.25 (0.74–1.74)
Family and friends encouraged me to pursue cochlear implants		96% (27)	3.00 (± 1.16)	2.46 (1.70–3.20)
I felt knowledgeable about cochlear implants		100% (28)	2.61 (± 1.10)	
I had reasonable expectations after implantation		100% (28)	3.18 (± 0.77)	
Prior benefit from and experience with hearing aids		86% (24)	2.07 (± 1.18)	1.00 (0.54–1.45)
Belief that a cochlear implant will improve the quality of my hearing		100% (28)	3.75 (± 0.52)	

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studies have identified unique patient-driven and system-driven factors that contribute to the decision to either proceed with or forgo implantation.[2,12–14,22] In addition to validating these prior findings, the current study is the first to utilize CI-specific PROMs to measure the impact of preoperative functional expectations and baseline quality-of-life on CI utilization.

Patient Demographic Factors

Patient demographics in the current study were representative of similar study populations of patients undergoing evaluation for cochlear implantation.[2,12] It is unsurprising that the response rate was greater for the CI group compared to the no-CI group (52% vs. 29%). Patients who undergo CI evaluation and forgo CI are difficult to study due to logistical difficulties with patient follow-up. Response rates to self-report surveys in this population have been documented as ranging from 26% to 39%, which is in line with our response rate of 29%.[13]

It is interesting to note that despite reporting similar family income levels and insurance types, the percentage of patients who were currently employed was higher in the no-CI group compared to the CI group (Table I). Patients in the no-CI group were also more likely to live in rural settings, and this combination of current employment with rural residence might contribute to increasing hardship with travel and access to care at CI centers.

Pure Tone and Speech Audiometry

In this study, patients who chose not to proceed with cochlear implantation had somewhat better audiometrically defined hearing abilities. For example, PTAs were lower (better) and sentence recognition scores higher in the no-CI group compared to the CI group (Table II). These results are in line with several prior studies that reported higher PTAs, lower CNC word scores, and lower AZBio sentence scores among CI candidates who underwent implantation compared to those who decided against surgery.[2,22] But see,[13] Taken together, these data suggest that poorer baseline hearing may act as a motivator for undergoing cochlear implantation.

Cochlear Implant Specific Quality of Life

Speech recognition scores alone are poor predictors of patient's real-world, self-reported communication abilities and QOL with CIs.[15–18,23–25] This is the first study to use CI-specific QOL instruments to explore the impact of baseline quality of life and functional expectations for life with an implant on CI utilization.

We found no substantial differences between the CI and no-CI groups in terms of CIQOL-Expectations domain scores, suggesting that patients in each group shared similar functional outcome expectations from a CI (Table III). In contrast, there were several notable differences between groups in terms of CIQOL-35 scores suggesting differences in baseline functional abilities (Table IV). Specifically, we found that scores in the emotional and entertainment domains were substantially higher in the no-CI group (Table IV). We interpret this to indicate that higher function in these domains may result in increased satisfaction with patients' current status and thus, decreased likelihood of pursuing cochlear implantation. Stated otherwise, decreased abilities in these domains in the CI group may have driven these patients to proceed with cochlear implantation.

Why were CIQOL-Expectations scores similar between patient cohorts, yet baseline CIQOL-35 scores differed? One explanation is that although patients in each group held similar expectations regarding the benefits that a CI could bring to their daily lives, only those patients in the CI group ultimately perceived the impact of hearing loss on their current QOL to be significant enough (particularly in the Emotional and Entertainment domains) to warrant undergoing surgery.

Barriers and Facilitating Factors to Cochlear Implantation

We identified several pertinent barriers and facilitating factors for patients in the CI decision-making process. In the no-CI group, the most commonly reported barriers were (1) fears over potential complications of surgery, (2) implant cost and (3) perceived degree of personal hearing handicap (Table V). Patients in the CI group cited several facilitating factors, with increased weight being placed on (1) the desire for better hearing to improve communication, (2) the belief that a CI would improve hearing quality, (3) the belief that a CI would improve the ability to interact socially and (4) trust in the CI team to deliver a positive result. These factors are topics of particular interest to potential CI patients that should be clearly addressed during CI evaluation counseling.

Several previously published studies have shed light on barriers to CI utilization in eligible candidates. For example, Redmann et al. retrospectively studied patients that underwent CIE and reported only 64% of patients who met eligibility requirements went on to receive a CI.[12] Of the 36% of patients who deferred CI, common reasons included choosing HA as an alternative, patient refusal, and cost-insurance issues.[12] Balachandra et al. also retrospectively studied eligible patients who deferred cochlear implantation and found the most common barriers cited by patients were the belief that CI would not significantly improve their ability to communicate, as well as concerns over post-operative recovery and surgical risks.[13] When Bierbaum et al. surveyed CI users and CI candidates regarding barriers to CI use, commonly cited reasons included concerns about surgical complications and loss of residual hearing, as well as cost.[14] Similar barriers were cited by the patients in the current study. Specifically, fears over surgical complications, implant cost and perceived degree of personal hearing handicap were commonly cited in the no-CI group (Table V). However, our study also expands upon prior published work by highlighting facilitating factors that aided in the decision to pursue CI, as well as by providing the first insights into the impact of CI-specific QOL measures on patient decision making in patients to elect to pursue or forgo CI. Our study provides the first empiric evaluation

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of CI uptake behavior using a validated patient-reported outcomes measure for CI-related QOL.

Study Limitations

There were several significant limitations in our study. First, this was not a hypothesis-driven study and we were therefore unable to perform a power analysis to determine an adequate sample size. This also limited the statistical analyses that we could appropriately perform to detect inter-group differences, which may increase the probability of type 2 statistical errors. Second, our patient sample was relatively small and from a large academic medical center, which together may limit the generalizability and external validity of our results to the greater population. The overall response rate was low (29%) and skewed toward the CI group (52% response rate vs. 29% response rate). It is, therefore, possible that observations made in this study may be influenced by unmeasured differences between participants and non-participants. Third, data derived from retrospective surveys can introduce recall bias. Finally, the nature of Likert data limited our ability to assess the strength of associations between the effects certain factors had on the decision to pursue implantation.

CONCLUSIONS

This study provides the first insights into the impact that CI-specific quality of life can have on the decision to either undergo or forgo cochlear implantation. Specifically, the results highlight that CI candidates who decide against implantation hold similar functional expectations about their post-CI abilities as candidates who undergo surgery, but they exhibit higher levels of baseline emotional and entertainment-related abilities. Given the poor rates of CI utilization, our hope is that the results illustrated here will prove essential in our attempts to better meet the needs of people with severe hearing loss who are considering cochlear implantation.

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