ARIC Manuscript Proposal #3261

PC Reviewed: 11/13/18   **Status: _____**   **Priority: 2**
SC Reviewed: _____   **Status: _____**   **Priority: ____**

1.a. Full Title: Disparities in Hearing Healthcare among Older Adults by Race/Ethnicity and Socioeconomic Position

   b. Abbreviated Title (Length 26 characters): Disparities Hearing Care

2. Writing Group:
       Writing group members:

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Other interested ARIC investigators

We welcome contributions from members of Gerardo Heiss' group.

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. __CN___ **[please confirm with your initials electronically or in writing]**

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3.   Timeline:
Analysis and manuscript will be completed within 8 months.

4.   Rationale:

Age-related hearing loss is highly prevalent and affects almost 30 million older Americans.[1-3] Increasing evidence documents an association between age-related hearing loss and negative outcomes in multiple domains related to aging, including psychological, physical, and cognitive function.[4-12] Although highly prevalent, relatively few older adults use hearing aids, one of the primary treatments of age-related hearing loss.[2,13] The prevalence of hearing aid use is approximately 15-20% of older adults with a clinically significant hearing loss.[2,13]

Multiple factors affect the rate of hearing aid use, including barriers to care related to accessibility and affordability.[14,15] Preliminary evidence from nationally representative samples, such as the National Health Examination and Nutrition Survey (NHANES), document disparities in hearing care use by race/ethnicity and socioeconomic position.[15-17] Hearing aid use is lower among African American and Mexican American older adults.[15-17] Previous studies on the epidemiology of age-related hearing loss consist of primarily white older adults with few to no representation of minority older adults.[18-20] Limitations also exist within NHANES in terms of representation of minority older adults.[15] Cohorts with a greater representation of minority older adults such as the ARIC cohort, combined with objective audiometric data, provide a unique opportunity to evaluate the potential role of race/ethnicity and socioeconomic position on hearing healthcare behaviors.

5.   Main Hypothesis/Study Questions:

Within a biracial cohort, do differences in hearing care use exist based on race/ethnicity and individual-level socioeconomic position?

We hypothesize that differences in hearing care use exist based on race/ethnicity and individual-level socioeconomic position with lower rates of hearing aid use among African Americans compared to White older adults and lower hearing aid use among those with lower individual-level socioeconomic position.

Aim 1: To describe the prevalence of hearing aid use by race/ethnicity and individual-level socioeconomic position.
Hypothesis 1: The prevalence of hearing aid use is lower among African Americans and individuals of low socioeconomic position compared to White older adults and those of high socioeconomic position.

Aim 2: To describe the association between race/ethnicity and individual-level socioeconomic position on hearing aid use.

Hypothesis 2: Race/ethnicity and socioeconomic position are independently associated with hearing aid use.

Aim 3: To test possible interaction between race/ethnicity and socioeconomic position on hearing aid use.
Hypothesis 3: An interaction term between race/ethnicity and socioeconomic position will not be significant.

6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).

Study Design: Cross-sectional study of ARIC visit 6 participants with hearing loss. Hearing loss will be defined as better hearing ear speech pure tone average (0.5, 1, 2, 4 kHz) greater than 25 dB HL based on the WHO classification.

Study Population: The analytical cohort will include older adults with an audiometric hearing loss based on the WHO classification. Participants with missing frequencies at 0.5, 1, 2, or 4 kHz will be excluded.

Outcomes:
Primary: Self-reported hearing aid use among ARIC visit 6 participants, collected via the HNE form, offered to all participants at visit 6.

Exposure: We will include the following independent variables in the analyses, which can be categorized as hearing related variables and demographic and individual-level socioeconomic position variables. We will include a derived variable for self-identified race/ethnicity-center given the strong association between race/ethnicity and center within the ARIC cohort. For variables related to individual-level socioeconomic position, we will include the following categorical variables as individual variables: education level (HOM54 from visit 1), literacy (WRAT3 from visit 5), annual household income (PHX1 from visit 6), self-reported financial situation (PHX3 from visit 5), and supplemental insurance (AQC2 from visit 5). We will also explore the influence of socioeconomic position over the life course (cumulative SES) and its potential association with hearing aid use.

Of note, neighborhood-level socioeconomic position and hearing healthcare are being considered in a separate analysis as part of another ARIC proposal.

Covariates:
Hearing related variables will be utilized in analysis to control for the degree of hearing loss. We will utilize pure tone air-conduction audiometry, specifically speech PTA from the better hearing ear based on thresholds obtained at 0.5, 1, 2, and 4 kHz (WHO categorization) and will test its inclusion as a continuous variable or as a categorical variable (i.e., mild, moderate, severe, etc.). Regarding demographics, we will include age as a continuous variable given the prevalence and severity of age-related hearing loss varies by age as well as sex as a categorical variable.

Statistical Analysis: Univariate and multivariate logistic regression will be used to estimate the association between race/ethnicity and individual-level socioeconomic position and hearing aid use. Models will be adjusted for age, sex, and severity of hearing loss which may confound the association between race/ethnicity and socioeconomic position and hearing aid use. We will explore possible interactions between race/ethnicity and individual-level socioeconomic position through the inclusion of an interaction term within models as appropriate as well as stratification by race/ethnicity and socioeconomic position.

Limitations: A potential limitation relates to the temporal nature of the data. Data on hearing loss are collected at visit 6, while data on socioeconomic position are primarily collected at visit 5. Although age-related hearing loss typically occurs gradually over the course of years to decades and was likely present at visit 5 if it was present at visit 6, we will conduct a sensitivity analysis and exclude participants with mild hearing loss who may not have had hearing loss five years prior.

7.a. Will the data be used for non-CVD analysis in this manuscript? ____ Yes   __X__ No

  b. If Yes, is the author aware that the file ICTDER03 must be used to exclude persons with a value RES_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES_DNA = "CVD Research" would be used? ____ Yes   ____ No
(This file ICTDER has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

    N/A

8.a. Will the DNA data be used in this manuscript? ____ Yes   __X__ No

8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER03 must be used to exclude those with value RES_DNA = "No use/storage DNA"? ____ Yes   ____ No

    N/A

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status.
ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: http://www.cscc.unc.edu/aric/mantrack/maintain/search/dtSearch.html

    ___X___ Yes   _____ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

#1015 – Ethnic/Race Disparities in Health-seeking Behaviors, Awareness of CKS and Progression of CKD
#1099 - SES across the Life Course and the Metabolic Syndrome
#2043 – Medication adherence, health literacy, and subjective and objective SES
#2640 – Disparities in cholesterol treatment and control by race, gender, and socioeconomic status among older patients with established atherosclerosis

11.a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data? __X__ Yes   ____ No

11.b. If yes, is the proposal
      ___   **A. primarily the result of an ancillary study (list number* _____)**
      _X__   **B. primarily based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)* _1998.02___ _____ _____)**

*ancillary studies are listed by number at https://www2.cscc.unc.edu/aric/approved-ancillary-studies

12a. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.

12b. The NIH instituted a Public Access Policy in April, 2008 which ensures that the public has access to the published results of NIH funded research. It is **your responsibility to upload manuscripts to PubMed Central** whenever the journal does not and be in compliance with this policy. Four files about the public access policy from http://publicaccess.nih.gov/ are posted in http://www.cscc.unc.edu/aric/index.php, under Publications, Policies & Forms. http://publicaccess.nih.gov/submit_process_journals.htm shows you which journals automatically upload articles to PubMed central.

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