A Community Health Worker Training Program to Deliver Accessible and Affordable Hearing Care to Older Adults

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Summary:

Community leaders collaborated with human-centered design practitioners and academic researchers to co-develop a community health worker (CHW) training program for delivering community-based hearing care to fellow older adults. When implemented by CHWs, clients' communication function improved comparably with outcomes following professional interventions. Community-based models offer opportunities to advance hearing health.

Keywords

Hearing loss; presbycusis; community health worker; health equity; health disparities; aural rehabilitation; human-centered design; social design; community engagement; community-delivered hearing care; older adults; healthy aging

Age-related hearing loss is highly prevalent and independently associated with multiple adverse outcomes, including incident dementia and accelerated cognitive decline.[1,2] However, relatively few older adults receive treatment. The overall rate of hearing aid use remains low in the United States (estimated 14–33% of total candidates) and disparities are observed across low socioeconomic and racial/ethnic minority groups, with rates of

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hearing aid use among minority older adults approximately half of that observed among non-Hispanic White counterparts.[1,3,4] Recent national calls for action to address hearing health disparities as a public health priority include recommendations for expanding the accessibility and affordability of care through community-based delivery models that incorporate task sharing, such as community health worker (CHW) models.[1]

Hearing aids are predominantly acquired through clinic-based settings and are associated with high out-of-pocket costs.[1,4] With the anticipation of over-the-counter (OTC) hearing aids entering the consumer market in 2021,[5] hearing care delivery models that connect older adults, particularly at-risk populations, to needed technology are critical. We describe a first-in-kind curriculum developed through transdisciplinary collaboration to train older adult lay community members as interventionists to deliver hearing care with OTC technology.

HEARS: A Community-Delivered Hearing Care Program

The Hearing Health Equity through Accessible Research and Solutions (HEARS) program is a theory-driven hearing care intervention designed to be delivered by trained CHWs that targets traditional barriers in accessing clinic-based hearing care.[6] Clients audiometrically screened for hearing loss through remote tablet-based technology[7] receive a personalized program across two days (totaling an estimated 2–2.5 hours) within their community settings. The program incorporates education around goal setting for clients, such as improving ability to follow spoken conversations. Clients also receive an introduction to age-related hearing loss and lessons on applying communication strategies to address situational listening challenges. Finally, the CHW provides instruction and support for appropriately using an OTC amplification device that a client selects following a brief orientation.[6]

The program is delivered by trained CHWs who follow a structured series of program manuals.[6] Each manual, along with features of the CHW training program, were developed following several guiding principles (Box 1), including human-centered design (HCD) (Figure 1).[8] The ultimate goal was to develop program materials that are accessible and usable by older adults, both the CHWs and clients.[9]

Guiding Design Principles

Community engagement.

We incorporated community engagement and human-centered design methodologies[8,10,11] to guide the development and enhance the acceptability of the training program. We approached the training program development and interactions with our partners through upholding multi-lateral learning between CHW trainees, housing staff, academic team members, and HCD practitioners.[11] The HEARS audiologist met with staff and resident leaders weekly at one of the residential sites to co-develop the CHW training curriculum, engage in training activities, and discuss fidelity monitoring plans.

Human-centered design.

Emerging from roots in "design thinking," human-centered design (HCD) is a qualitative approach for discovering innovative and viable solutions to problems through an iterative process of prototyping and testing ideas (Box 2).[8,12] Human-centered design involves collaboration across stakeholders, particularly target users and beneficiaries, while considering realistic constraints.[13] As a systematic methodology, HCD has origins beginning in the early 1980s and it was popularized by the business sector for creating consumer-driven commodities in the 1990s.[8,13] Health care and public health initiatives have since begun leveraging HCD to tackle projects such as optimizing hospital shift change protocols, health risk assessment strategies, as well as the design and implementation of public health programs targeting social determinants of health.[8,13–16]

Human-centered design practitioners incorporate empathy, or a deeper consideration of people's needs and their experiences using a product, into their drafting process with the goal of creating user-friendly results.[12,13,16] From the business perspective, HCD aims to improve satisfaction with products given the multiple refinements guided by a deeper understanding of consumers' needs.[8,14,16] Application of HCD to public health initiatives may similarly facilitate greater acceptability and, ultimately, sustainability by valuing community partnerships.[10,16]

The HCD process also promotes divergent thinking as an essential component in the creation and testing of novel ideas, which often requires a team with diverse backgrounds.[8,16] This approach complements principles of community engagement as it frames lived experiences as expertise, involving community partners as co-creators.[10,11,16] The HEARS program benefits from collaboration with HCD practitioners from the Center for Social Design at the Maryland Institute College of Art (MICA) along with academics from multiple disciplines including audiology, gerontology, nursing, and otolaryngology. The program's mission to target a public health disparity compliments the specialty of *social design*, which targets effecting positive social change through the HCD process (https://www.mica.edu/research/center-for-social-design/).

Developing and Testing a CHW Training Program

Project goal.

The HEARS program was developed to be delivered by trained para-professionals, including CHWs, and an initial pilot study was previously delivered by a single trained professional interventionist.[6] The goal of the project described here was to develop a CHW training program for preparing lay individuals to promote the value of hearing health, deliver the HEARS program, and become certified HEARS interventionists.

Context and collaborators.

The development of the HEARS CHW training program incorporated community interests and representation through partnerships with local leaders. The relationship built upon existing collaborations that began in 2013, when the HEARS program was initially conceived, developed, and piloted. The community advisory board (CAB) formed in

2013 continued throughout this project and remains active today. The CAB consists of representatives from affordable older adult housing organizations in the Baltimore area, including Weinberg Senior Living and Catholic Charities, city officials from the local Area Agency on Aging (AAA), building Service Coordinators who advocate for residents, resident leaders from participating buildings, and representatives from HASA, a local nonprofit organization providing hearing care services. In addition to CAB meetings, the academic team and HCD practitioners sought out regular ad-hoc consultation with community representatives during the development of program materials, delivery plans, and program evaluation.

Program CHWs and clients.

Volunteer residents serving as CHW trainees (n=6) were recruited based on nominations from housing staff who identified trusted community leaders as potential trainees. The CHWs' clients (n=14) were recruited through a building-wide information session. All clients were community-dwelling residents from the same independent housing network as the CHWs, Weinberg Senior Living. See Table 1 for demographic details. Clients had the option of inviting a communication partner (e.g., spouse/partner, adult child) to join their sessions with the CHWs. Through consultation with the CAB, volunteers serving as CHWs were offered monthly remunerations for their time during the course of the program development and implementation. The plan was approved by the Johns Hopkins School of Medicine's Institutional Review Board and all volunteers provided consent for participating. Pre- and three-month post-intervention self-reported assessments were gathered from clients to assess the CHW training program's preliminary impact.

Program site.

Weinberg Senior Living is a nonprofit older adult community housing network nested within a local faith-based organization, Comprehensive Housing Assistance, Inc. (CHAI).

A training program for CHW-delivered hearing care.

Curriculum development.—We first developed a training framework to support a high-quality, high-fidelity delivery of the HEARS intervention by CHWs. The HEARS audiologist prototyped classroom modules based on adaptations of the Gallaudet University Peer Mentoring Training Program.[17] The original program from Gallaudet University is a hybrid online/campus-based certificate program designed to prepare adults with hearing loss to work alongside clinical professionals in aural rehabilitation by providing informal support, mentoring, and coaching to other adults with hearing loss.[17] With input from the CHW trainees and housing staff, we assessed the relevancy and appropriateness of the training program's format and content based on a thorough review of the HEARS intervention.[6] Our team co-identified the interpersonal skills needed to serve as an effective CHW for the target client population and efforts also focused on ensuring printed materials were written at or below a 6th–7th grade reading level. The curriculum was refined from an initial prototype comprising 14 weekly modules (1.5 hours each) to eight weekly modules (2 hours each) (Box 3).

CHW trainee evaluation and certification.—The HEARS audiologist assessed the acceptability of the CHW training program, specifically the module structures, learning activities, approaches for evaluation, and participation policies with CHW trainees and community partners. Trainees demonstrated content and technical competencies through supervised practical exercises evaluated through a structured rubric assessing levels of independence, comfort, and appropriateness of delivery. Based on the evaluation, successful trainees interested in proceeding earned a certificate to serve as a CHW interventionist (HEARS Teacher) who delivers the HEARS program or as a support personnel (HEARS Promoter) who serves as a community liaison for referrals and program operations. We certified two HEARS Teachers who met training benchmarks and two HEARS Promoters from the first cohort. Two CHW trainees chose not to complete the training due to conflicting priorities.

Monitoring program fidelity.—Fidelity monitoring protocols for CHWs delivering the HEARS program were co-developed with community input, including procedures for audio recording a subset of interventions for evaluation purposes. We established monthly group meetings following certification with CHWs for opportunities to provide booster trainings and technical support as needed, continuing education, and team building activities. Additionally, CHWs received remote support through weekly case reviews by phone with the audiologist to preserve the personal dynamics between CHWs and clients. The communication plan (i.e., monthly meetings and weekly phone calls) was intended to enhance training program feasibility and intervention quality, safety, and acceptability. All interventions were delivered in reserved community spaces within the residential building. One client invited a communication partner to join and all other clients had one-on-one sessions with their CHW.

CHW training program evaluation.

To evaluate the CHW training program's preliminary impact, we assessed HEARS clients' three-month post-intervention outcomes. A team of two trained data collectors recorded survey data through standardized interviews with printed questionnaire cards that also reflected the design principles detailed in Box 1. Self-reported outcomes included communication function (Hearing Handicap Inventory for the Elderly-screening version, HHIE-S[18]) and a program evaluation from all clients who completed their three-month follow-up (n=9). All clients (9/9) indicated at least some benefit from the CHW-delivered HEARS program and felt more connected with others. A majority shared that they met personal communication goals through the program (88.9%, 8/9) and that HEARS enabled them to feel less frustrated by communication difficulties (88.9%, 8/9). A majority indicated that the program was instrumental in learning how to use an OTC amplification device (77.8%, 7/9). Furthermore, all clients shared that the CHW was the most useful aspect of the program and all would highly recommend the program to others (9/9). The median change in communication function as measured by the HHIE-S was −8 (IQR: 21) over three-months, indicating improvements in communication function. This compares to both the previous HEARS pilot that was also measured over three months, and professionally-delivered care with hearing aids.[6] (Figure 2)

Future directions.

Building from the initial CHW training program, HEARS is currently undergoing a randomized controlled trial (NCT03442296) based in over 10 community sites throughout Baltimore and includes eight trained older adults as CHWs. We continue to foster local partnerships with community organizations through an active CAB. Our collaboration with HCD practitioners enables design adaptations to setting-specific challenges such as client recruitment. The HEARS program has been adapted and tested at multiple sites nationally and internationally.[19–21] Access HEARS, a separate nonprofit organization with national-and state-level funding, focuses on building a sustainable and scalable model of community-delivered hearing care and serves as an important agent in transitioning pilot programs into practice.

Given the growing number of pilot programs that leverage community resources to provide accessible hearing care, targeting local- and national-level policies is critical to support ongoing implementation and dissemination.[19] Policies must focus on sustainability through the development of reimbursement mechanisms. Other priority policy areas include defining scope of practice, standardizing training curricula, and regulating certification processes for CHWs providing hearing care to ensure quality and safety.[19]

Conclusion.

There is growing recognition of the need to address hearing loss among older adults as a national and global public health imperative.[1,22] Options to obtain hearing care in the United States are generally limited to those with enough resources and clinic-based models often fail to provide adequate access.[1] A community-based program that trains CHWs, specifically older adult peer mentors, is feasible, acceptable, demonstrates preliminary improvements in outcomes, and represents a critical avenue for advancing task-sharing in hearing care as a public health approach to age-related hearing loss.[19] With the coming expansion of OTC hearing aids, community-delivered, evidence-based models, such as HEARS, are needed to advance hearing health equity.

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Box 1.

DESIGN PRINCIPLES FOR ENHANCING ACCESSIBILITY BY OLDER ADULTS

Hierarchy: *The most important information should be dominant visually for effi cient page orientation*

- Each page should host limited tasks/concepts to avoid cognitive overload

- Limit excessive texts and elements to support selective attention

Layout: *Use clean and consistent layouts to avoid overwhelming the audience who are learning new content*

- Print page titles in the same location throughout, except on the main cover and subcover pages

- A table of contents in the beginning helps prepare the audience's expectations accordingly

- Subcover pages signal a shift in topics and help orient the audience for processing content effi ciently

- Maximize the use of white space for visual breaks; this minimizes risks of cognitive overload

Iconography: *Designs familiar in styles such as those seen in public places convey information effi ciently*

- Curved lines and edges are less harsh visually and promote a more casual, inviting, and relaxed setting

- Use symbol icons throughout to help navigate the audience's attention and support procedural memory

Font: *Use large font sizes (14 point and above) for visual accessibility*

- Use 90% black color to maintain high contrast against white backgrounds while avoiding the jarring visual effect of 100% black

- Select a font that is sans-serif with simple curved lines, which promotes a friendly and casual setting

- Bold letters in titles help draw attention first; use bolded texts for accentuating vital information, but avoid distracting the audience through overuse

- Avoid capitalizing all letters, which creates a perception of yelling, except in logos or to highlight important points

- Crowded texts may be overwhelming and cultivate anxiety; allow significant white space between lines of texts for "visual breaks"

Colors: *Avoid yellow, green, and blue in close proximity as differentiating these become more difficult in age*

- Increasing color contrasts between texts, graphics, and background provide better visual accessibility

- Colors should be at mid-tone; over-saturation may distract and fatigue the eyes and under-saturation may lead to eye strain

- Warmer colors with longer wavelengths, such as yellows, oranges, and reds, offer higher contrast against white and black backgrounds; apply colors judiciously and consider that yellow tones for texts can be difficult to read and that red tones may be alarming and distracting

- Test color choices with the target audience as emotional connotations are subjective and vary across demographics

> **Box 2.**
>
> ## HUMAN-CENTERED DESIGN PROCESS
>
> **Frame & Plan**
>
>   **a.** Organize and learn from existing research (including scientific data) that are associated with the problem.
>
>   **b.** Facilitate discussions around key research to understand the problem more intimately and to appropriately plan project engagements.
>
> **2. Research**
>
>   **a.** Strive to understand the culture and context of the problem by learning about the people involved.
>
>   **b.** Talk to, observe, and actively learn from project stakeholders to identify relevant needs and assets to support and leverage.
>
> **Synthesize**
>
>   **a.** Compile research observations and lessons learned and search for common themes.
>
>   **b.** Embrace the unexpected as they come, including insights, ideas, and inspiration.
>
>   **c.** Find appropriate opportunities through collaborations for intervention.
>
> **Ideate**
>
>   **a.** Brainstorm as many ideas as possible and defer judgement (no bad ideas during drafting phases!).
>
>   **b.** Generate ideas visually, creatively, and share openly.
>
>   **c.** Focus on bigger concepts, not results.
>
>   **d.** Document the creative process and routinely refine ideas along the way.
>
> **Prototype**
>
>   **a.** Create tangible representations of ideas.
>
>   **b.** Prototype with target people to check assumptions, lower risks, align expectations across all stakeholders, and uncover potential issues early.
>
> **Implement & Iterate**
>
>   **a.** Test, iterate, and develop prototypes centered on local contexts.
>
>   **b.** Document and gather feedback for informing the development of strategies and interventions for feasibility, acceptability, sustainability, and target effectiveness.
>
> *Note*:

Source: Adapted from Center for Social Design, Maryland Institute College of Art (MICA); Baltimore, MD (2021). Available at: https://www.mica.edu/research-center-for-social-design/process/
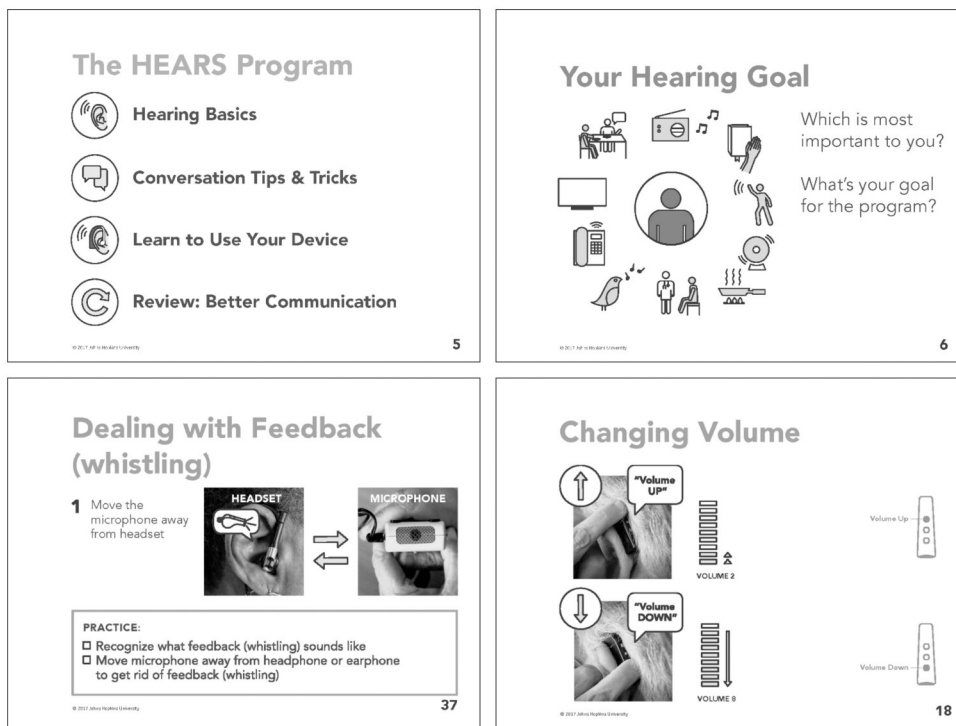
Box 3.

HEARS COMMUNITY HEALTH WORKER TRAINING MODULES

Prototype Structure		Final Structure	
14 sessions (1.5 hours each)		8 sessions (2 hours each)	
1	Program Introductions: The role of the community health worker; Why does hearing matter?	**1**	Program Introductions: Why does hearing matter and qualities of a great HEARS Teacher.
2	Background: Physiology of hearing loss and red flag symptoms.	**2**	Program Content: HEARS Introduction book.
3	Background: Hearing screenings vs. hearing tests.	**3**	Program Content: Hearing & Communication book (Hearing Basics).
4	Technical training: Hearing screenings.	**4**	Program Content: Hearing & Communication book (Conversation Tips & Tricks).
5	Background: Communication strategies.	**5**	Program Content & Technical Training: HEARS Device 1.
6	Background: Listening devices vs. hearing aids; Introduction to HEARS devices.	**6**	Program Content & Technical Training: HEARS Device 2, Part 1 (Device Orientation & Operations).
7	Technical training: HEARS Device 1.	**7**	Program Content & Technical Training: HEARS Device 2, Part 2 (Device Troubleshooting & Care/ Maintenance).
8	Technical Training: HEARS Device 2.		
9	Program Content: HEARS Introduction book.	**8**	Wrap-Up: Worker pledge review, encountering difficult cases.
10	Program Content: Hearing & Communication book.		
11	Program Content: HEARS Device 1 book.		
12	Program Content: HEARS Device 2 book.		
13	Wrap-Up: Pledge review and encountering difficult cases.		
14	Individual Review Meetings		

Figure 1.
Examples of HEARS Program Manual Pages

Note:

HEARS materials are professionally printed single-sided in selected colors through following the principles described in Box 1, including community involvement. Manuals are either spiral-bound or saddle stitched for ease in use during program delivery.
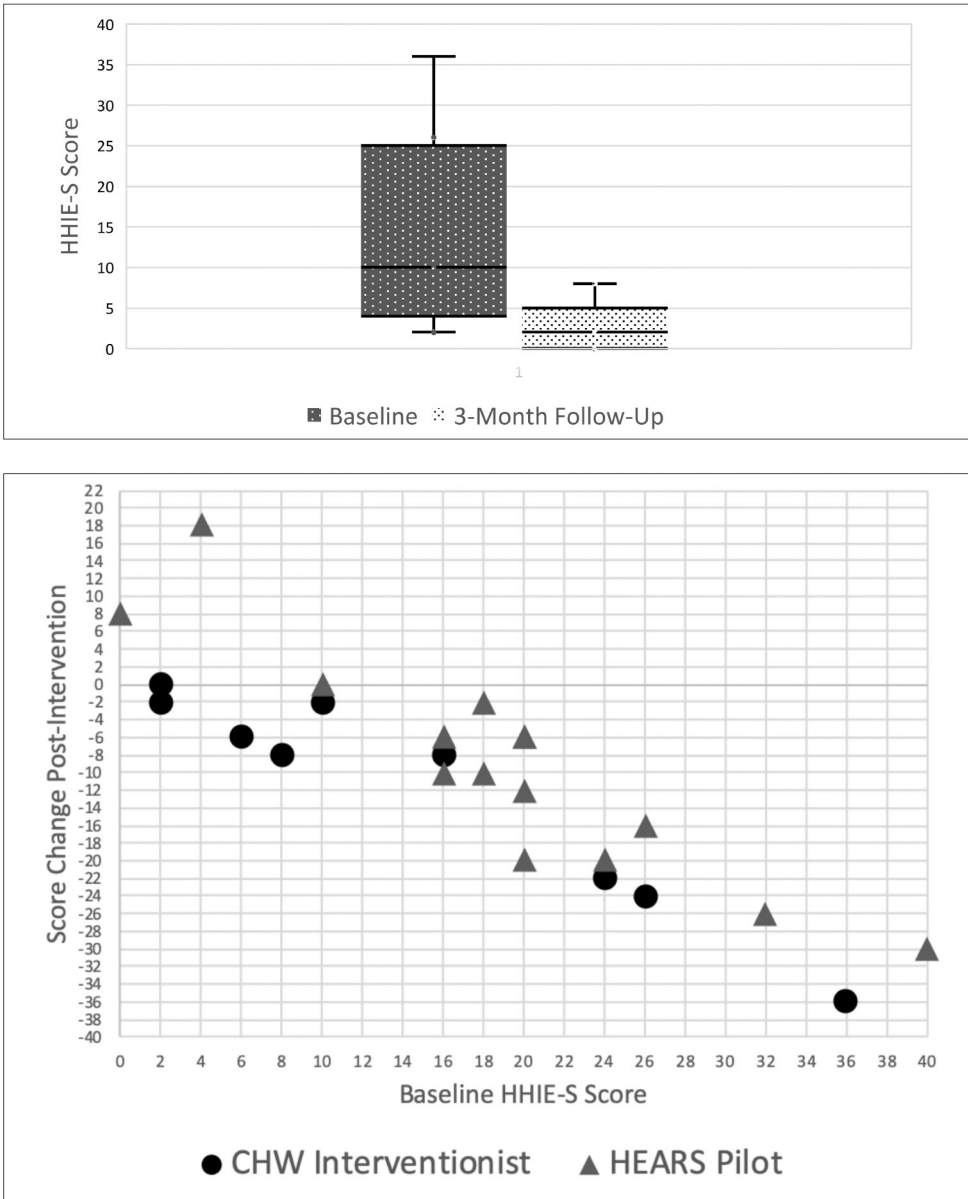
Figure 2.

HEARS Client Hearing Handicap

Note:

TOP: Baseline self-reported hearing handicap scores (Hearing Handicap Inventory for the Elderly, Screening Version; HHIE-S) versus 3-months post-intervention scores. A score of 10 represents where follow-up hearing care is recommended.[18] BOTTOM: Higher baseline HHIE-S scores generally yielded greater reductions (improvements) in self-reported hearing handicap following the HEARS intervention. Group median change in HHIE-S is −8 (IQR: 21) and −10 (IQR: 18) as delivered by CHW interventionist and the HEARS pilot's professional interventionist,[6] respectively.

Table 1.

VOLUNTEER CHARACTERISTICS

Demographics	Volunteers
Age (years), median (IQR)	71.5 (66.6–78.5)
Female sex, n (%)	12 (60)
Race/ethnicity, n (%)	
Non-Hispanic Black or African American	15 (75)
Non-Hispanic White or Caucasian	3 (15)
Hispanic and/or Latinx	1 (5)
Other	1 (5)
Highest level of education completed, n (%)	
Less than high school	5 (25)
High school graduate or GED	4 (20)
Greater than high school	11 (55)
Annual income, n (%)	
Less than $25,000	18 (90)
More than $25,000	2 (10)
Lived alone, n (%)	20 (100)