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REVIEW ARTICLE



Identifying educational interventions aimed at improving communication with older adults with age-related hearing loss: a scoping review and thematic analysis

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ABSTRACT

Objective: This scoping review summarises existing interventions aimed at educating individuals without hearing loss to enhance their communication with older adults experiencing age-related hearing loss (ARHL).

Design: Data collection employed a systematic search approach as per the guidelines of Arksey & O'Malley, and followed the PRISMA-ScR guidelines.

Study selection: A structured search was conducted involving four research databases from 2000 to 2023, with additional grey literature searching. Original papers written in English, reporting the design and implementation of educational interventions targeting communication with older adults with ARHL, were included. Reflexive thematic analysis was used to identify themes related to intervention type and methodology, and key findings.

Results: 13 eligible intervention studies were identified and summarised. Four main themes were described: (1) education and communication skills training; (2) mode of intervention delivery; (3) appropriateness of the intervention and satisfaction among participants; (4) transforming attitudes on hearing loss for better relationships and emotional well-being.

Conclusions: The link between hearing loss and diminished quality of life in older adults with ARHL highlights the importance of ongoing development of innovative educational programmes targeting effective communication in diverse settings, including clinical environments.

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Age-related hearing loss; presbycusis; education; interventions; enhancing communication

Introduction

Age-related hearing loss (ARHL) is the most common sensory deficit affecting older adults (Bowl and Dawson 2019), stemming from various factors such as metabolic diseases, ototoxic drugs, noise exposure, and age-related hair cell degeneration (Yang et al. 2023). European prevalence studies estimate that about 30% of males and 20% of females experience a 30 dB or greater hearing loss by age 70, increasing to 55% of males and 45% of females by age 80 (Quaranta et al. 2015). International studies also show significant prevalence rates, with bilateral hearing loss exceeding 25 dB reported in 27% of those aged 60–69, 55% in 70–79, and 79% in individuals aged 80 and above (Wattamwar et al. 2017). With increasing life expectancy, ARHL will persist as a prominent concern among adults (WHO 2021).

ARHL significantly impacts the quality of life (QoL) of older adults and has been associated with poorer cognitive function, with implications for dementia risk (Lin, Ferrucci, et al. 2011; Livingston et al. 2020; Slade, Plack and Nuttall 2020). Taljaard et al. (2016) reported that cognitive abilities are notably worse in individuals with HL compared to those with normal hearing, and the severity of cognitive impairment correlates with the

degree of HL. Additionally, older adults with ARHL often experience psychosocial challenges, including social avoidance, increased loneliness, and higher rates of anxiety and depression (Brewster et al. 2018; Gratton and Vázquez 2003; Nachtegaal et al. 2009; Shukla et al. 2020).

ARHL does not only impact on affected individuals but also their families, caregivers, and friends (Bowl and Dawson 2019; Gratton and Vázquez 2003; Roth, Hanebuth, and Probst 2011). Communication breakdowns are common in daily interactions for those with sensory loss (Hazan et al. 2018; Heine and Browning 2002), where older adults with ARHL often struggle to hear soft or indistinct speech and to follow conversations, especially in noisy environments (Erber 1993; Garstecki and Erler 1998; Lu et al. 2024). Furthermore, individuals with HL frequently must adapt to their conversation partners' communication abilities rather than the reverse, leading to conversational stress and avoidance, and ultimately contributing to increased social isolation (Christian, Dluhy, and O'Neill 1989; Dixon et al. 2020; Erber and Scherer 1999; Hallberg and Carlsson 1991; Leinhaas and Hedstrom 1994; Scott et al. 1994; Shukla et al. 2020).

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In a complementary manner, ARHL can greatly impact the quality of healthcare received by older adults. US national health survey data have revealed that older patients with hearing loss are more likely to report poorer communication with their healthcare provider (Mick, Foley, and Lin 2014). Barnett and colleagues (2002) identified that medical curricula do not include any mandatory training on communication skills necessary for working with people with HL. They also noted a paucity of research around approaches to teaching either medical students or other trainee health professionals how to communicate with patients who have ARHL, or the psychosocial issues linked with miscommunication.

Research into interventions designed to improve communication with older adults with ARHL has focused on rehabilitation, hearing aids, cochlear implants, and speech recognition (Schneider et al. 2010). To date, much of the research has focused on interventions targeting the older adult with hearing loss. A limited amount of literature has looked at how groups such as caregivers, family members, friends or medical professionals can improve communication for people with ARHL (Cohen et al. 2017; Smith et al. 2020). Solutions based solely on a person's usage of hearing aids or personal sound amplifiers ignore that fact that older adults are often unaware of their hearing impairment, and may be reluctant to wear such devices (e.g. McCormack and Fortnum 2013). Furthermore, data shows that voice amplifiers only have a marginal effect on patient-reported quality of communication as well as on objective measures of knowledge transfer (Blazer et al. 2016; Fook and Morgan 2000; Franks and Timmer 2024; Messersmith, Jorgensen and Hagg 2015). Thus, there is a need to better educate, prepare and train people to communicate with this growing patient population (Mick, Foley, and Lin 2014).

A study by Heine and Colleagues (Heine et al. 2002) asked adults with ARHL and their spouses about their communication difficulties and needs. Study findings revealed that an overwhelming majority of both those impacted by ARHL, as well as their spouses, felt they would benefit from a communication training programme. There is a clear need to consider alternative strategies when communicating with older adults who have ARHL. One often-overlooked method is education regarding how to communicate effectively with older adults who have ARHL, with the aim of reducing their communication challenges.

This scoping review aims to summarise existing intervention-based studies aimed at educating people to better communicate with older adults who have ARHL. Additionally, reflexive thematic analysis was used to identify and describe themes in the existing evidence base pertaining to intervention methods and key study findings.

Methods

This scoping review adhered to the methodology outlined by Arksey and O'Malley (2005). Authors utilised the checklist outlined by the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (Tricco et al. 2018) to ensure transparency and quality of results (Supplementary Table 1). To complete this review, the researchers followed an iterative process. The researchers implemented a reflexive approach, repeating steps where necessary to achieve comprehensive results (Arksey and O'Malley 2005; Oliver 2001).

Rationale for employing a scoping review methodology

A scoping review was chosen to provide a comprehensive overview of educational programmes designed to enhance communication in older adults with ARHL. This approach was appropriate given the evolving nature of this research area and the need to map existing evidence systematically (Arksey and O'Malley 2005). While grey literature was considered in the search, the majority of relevant studies were retrieved from peer-reviewed sources. This review serves as an initial landscape analysis, identifying key themes and gaps in the literature, and laying the groundwork for future systematic reviews.

Stage 1: identifying the research question

The initial step was to generate a broad research question to capture a wide range of applicable literature. The researchers also considered the population, intervention, and outcomes to be included in the research question (Arksey and O'Malley 2005; Centre for Reviews & Dissemination 2001). Thereafter, the following research question was determined: "What is the extent of knowledge within the existing literature regarding educational programmes, designed for individuals engaged in communication with older adults affected by ARHL, including their availability, efficacy, and any related factors?"

Stage 2: identifying relevant studies

The search strategy (See Table 1) involved creating a search string with terms related to interventions for communication with older adults with ARHL. Initially, four key search words were identified: "communication," "older adult," "hearing loss," and "intervention." A preliminary overview of available literature was conducted using Google Scholar by author one (AM) to refine the search. Following the Joanna Briggs Institute recommendation to use at least two databases during search string development, PubMed and Embase were utilised. Relevant papers from the initial search helped identify further key words. A comprehensive search, employing the designed search string, was conducted on four databases: PubMed, Web of Science, Embase, and EBSCOHost (Supplementary Table 4). Synonyms and related terms for the four key search words were determined through discussion and agreement between authors one and two (AM and IL) and were integrated into the search strategy. Truncation was used to ensure the retrieval of all possible variations of search terms.

Manual searches were conducted on the reference lists and citations of included articles. All identified literature considered to be relevant to the research question was also included.

Grey literature searching

A search was conducted on both Google and Google Scholar, with authors using the anonymous search function to prevent past browser history from influencing results. The specified search string and various combinations of terms were input into both search engines. Author two (IL) reviewed the first ten pages of results from each search engine to assess whether the titles of the publications obtained aligned with the research question at a screening level. Publications deemed potentially relevant underwent a full-text review to determine if they met the inclusion criteria.

Table 1. Search strategy conducted on PubMed.

Search Strategy	
Date of Searches	30 March 2023 and 16 May 2023
Use of Key words and All Fields Approach	"communication" [ALL FIELDS] AND ("elderly" [ALL FIELDS] OR "older adult" [ALL FIELDS] OR "older person" [ALL FIELDS] OR "geriatric" [ALL FIELDS]) AND ("hearing impaired" [ALL FIELDS] OR "hearing loss" [ALL FIELDS] OR "presbycusis" [ALL FIELDS] OR "age related hearing loss" [ALL FIELDS]) AND ("intervention" [ALL FIELDS] OR "training" [ALL FIELDS] OR "education programme" [ALL FIELDS])
Population Parameters	Caregivers, spouses, family members, wider members of the community or any professionals (both qualified and trainee) working with or communicating with older adults presenting with ARHL
Timeline Parameters	2000–2023
Language Parameters	Only articles published in English

Additionally, relevant websites were identified through a Google search (Supplementary Table 5). Author two (IL) compiled a list of these websites and manually searched them for potentially applicable information. All websites relevant to the research questions and meeting the inclusion criteria underwent further screening.

Stage 3: study selection

Eligibility criteria were formulated using the PIO framework, a variation of the PICO framework (Munn et al. 2018). A summary of study selection, adhering to PRISMA-ScR is outlined in Supplementary Figure 1.

Inclusion criteria

Population

Articles which focused on caregivers, spouses, family members, wider members of the community or any professionals (including those in training) working with or communicating with older adults presenting with ARHL

Intervention

Articles which described the implementation of education programmes targeting communication with older adults with ARHL, including programmes which focused on ARHL in the wider context of hearing impairment, deafness, or hearing loss.

Outcomes

Articles discussing the perceived benefits of educational communication programmes for individuals with ARHL, using any outcome measure.

Other

Primary data or grey literature published in the English language between 1 January 2000 and 1 July 2023 was included. Randomised control trials, feasibility studies, qualitative studies as well as studies in their early stages which published preliminary results were included. Studies were included if they reported on training, counselling or educational programmes on how to better communicate with those who had ARHL (or where ARHL was considered alongside other types of hearing loss). Studies were also included if they concerned older adults with ARHL and concomitant cognitive impairment, as HL can be a comorbidity associated with dementia (Liu and Lee 2019).

Articles were excluded if: (1) they were published in languages other than English or prior to 1 January 2000; (2) they

involved systematic reviews or commentaries; (3) the intervention targeted adults with ARHL to improve their own communication skills; (4) the study focus was on communicating with older adults who did not have HL, or children with hearing loss.

Stage 4: charting the data

The following study characteristics were charted by author one (AM) for each paper: study country, goal of study, design, sample and age, measures, and intervention outcomes. Additionally, for each intervention, the aims, target population, and results were charted (see Supplementary Tables 2 and 3).

Stage 5: collecting, summarising and reporting the results

Firstly, study characteristics were analysed descriptively, including geographic distribution and population groups. Secondly, intervention characteristics were summarised descriptively based on focus of intervention, mode of delivery, and outcome measures. Consistent with recommendations by Levac, Colquhoun, and O'Brien (2010), reflexive thematic analysis was used to develop key themes, and summarise and narratively report findings. Central themes related to three conceptual categories (intervention type, methodology adopted, and key findings) were identified during data analysis using Braun and Clarke (2019) guidelines involving a process of inductive thematic analysis. This procedure was conducted in an inductive way through six phases: (a) the first and second author familiarised themselves with the content of each paper and highlighted and made notes on content that directly addressed the focus of the analysis (i.e. intervention type and methodology adopted, and key findings), and (b) generated semantic codes from the extracted information to (c) construct themes; initially, (d) preliminary themes were generated by the first and second author (AM and IL), and these were reviewed by all authors. Lastly, (e) the final themes were generated and (f) summarised descriptively.

Results

The database search identified 1887 studies, while references from other sources i.e. citation searching, and grey literature, yielded 30 studies. Once duplicates were removed, 1444 studies remained. After screening titles and abstracts, 1262 studies were excluded. The remaining 180 studies underwent full text screening and 13 of these were included in this scoping review (see Supplementary Figure 1 for PRISMA flow diagram).

Table 2. Characteristics of the studies.

Study; country	Goal of study	Design	Sample and Age	Measures	Intervention Outcomes
Ghazavi et al. 2016; Iran	To investigate the effect of a family-oriented communication skills training programme on depression, anxiety, and stress in older adults.	Randomised Control Trial	Older adults ($n = 64$; intervention, $n = 32$; control, $n = 32$) and their primary care givers ($n = 60$)	Self-reported measures	Depression, anxiety and stress in the older adult, based on 21-item depression, anxiety, and stress scale (DASS21), which completed by intervention and control groups
Kramer et al. 2005; The Netherlands	To examine whether addition of a home education programme (for both hearing impaired older adults and their significant others) to standard audiological care i.e. hearing aid fittings would enhance communication more than hearing aids alone.	Randomised Control Trial	Older adults with hearing impairment ($n = 48$); mean age 70 years Significant others ($n = 46$); mean age 62 years	Self-reported measures	(1) Older adults' and significant others' satisfaction with programme (2) Older adults' emotional response to participation in programme (3) Older adults' perceived improvement in communication skills (4) Significant others' attitudes to hearing impairment (5) Measure of change (based on the International Outcome Inventory (IOI)), as completed by older adults
Kruse et al. 2021; Germany	To evaluate the effectiveness of an online deaf awareness workshop provided to medical students.	Quantitative, Pretest-Posttest	Medical students ($n = 95$)	Self-reported measures	(1) Effectiveness of an online deaf awareness workshop (2) Knowledge of and competence in communication with deaf or hard of hearing (HOH) patients in medical settings.
Lock 2003; Canada	To design and describe educational workshop for medical students as an initial step in addressing the improvements required in health care delivery to deaf and hearing-impaired people.	Mixed methods, quasi-experimental	1st and 2nd year medical students at Dalhousie University, Canada ($n = 60$ and $n = 30$, respectively)	Self-reported measures	(1) Satisfaction with educational workshop (2) Awareness among medical students of the communication needs of individuals with deafness or hearing impairments
Mathews et al. 2011; United States of America	To implement a role-reversal exercise to increase first-year pharmacy students' awareness of communication barriers in the health care setting, especially for deaf and HOH patients.	Mixed methods, quasi-experimental	1st year pharmacy students	Self-reported measures	(1) Post-exercise survey of students' awareness and development of communication skills which they can use when communicating with deaf or HOH Patients (2) Students' experience of participation in exercise
Meijerink et al. 2022; The Netherlands	To examine the effects of web-based Support Program (SUPR) for communication partners of persons with hearing loss (HL) in a hearing aid (HA) dispensing setting.	Quantitative, Cluster Randomised Control Trial	Hearing aid users aged 50+ and their communication partners.	Self-reported measures	(1) Third-party disability and functioning as measured by 27-item Significant Other Scale for Hearing Disability (SOS-HEAR) which assesses six domains: communication changes, communicative burden, relationship changes, going out and socialising, emotional reactions, and concern for a partner (2) Hearing aid (HA) rehabilitation outcomes were measured using three items of the International Outcome Inventory for HAs—Significant Other (IOI-HA-SO)

(continued)

Table 2. Continued.

Study; country	Goal of study	Design	Sample and Age	Measures	Intervention Outcomes
Meyer et al. 2020; Australia	To investigate the feasibility of "Hear Communicate Remember," a telehealth intervention for family caregivers of people with dementia and hearing impairment to promote memory, communication and hearing aid use.	Mixed methods, quasi-experimental	Older adults with dementia and hearing impairment ($n = 6$); mean age of 81 years Caregivers of older adult ($n = 6$); mean age of 74 years	Interviews and self-reported measures	(3) A process evaluation to evaluate how communication partners used SUPR caregivers: (1) Impact of the intervention (2) Appropriateness of intervention (3) Resources and considerations for delivery via telehealth
Pisano and Miller 2018; United States of America	To educate students on hearing loss and identify programme impact	Quantitative, Pretest-Posttest	Pharmacy students at St John's University commencing their advanced pharmacy practice experiences in advanced community pharmacy or ambulatory care ($n = 92$)	Self-reported measures	(1) Understanding types and degrees of hearing loss and impact on communication (2) Satisfaction with training programme
Nieman et al. 2017; United States of America	To describe a community engagement approach (HEARS programme) addressing disparities between hearing impaired (HI) and their communities. To report preliminary outcomes and discuss implementation processes for wider use.	Quantitative, Randomised Controlled Trial	Older adults with hearing loss not currently using a hearing aid ($n = 15$); all over 60 years of age Chosen communication partner ($n = 15$); at least 18 years of age	Self-reported measures	Completed by older adults: (1) Communication function, capturing the social and emotional effects of hearing loss and related communication difficulties (HHIE-5, Hearing Handicap Inventory for the Elderly-Screening) (2) Health-related quality of life (SF-36, Short-Form General Health Survey) (3) Acceptability of HEARS programme based on the International Outcome Inventory-Alternative Interventions (IOI-AI)
Preminger 2003; United States of America	To: (1) Determine whether involvement of significant others in group audiological rehabilitation classes could reduce hearing handicap further than that provided by the class alone; (2) analyse changes in hearing handicap following group classes separately for individuals with hearing loss and their significant others; (3) analyse whether individual subject characteristics could be used in order to preselect which individuals could benefit from participation in group AR classes.	Quantitative, Non-Randomised Control Trial	Older adults with hearing loss ($n = 25$); mean age of 71.3 years Significant others ($n = 25$); 19 married partners, 3 companions and 3 daughters.	Self-reported measures	Completed by both older adults and significant others: (1) Hearing handicap as measured using the Hearing Handicap Inventory for the Elderly (Adults) (HHIE), which also assesses social and emotional function (as it relates to hearing loss), and is a measure of hearing handicap. (2) Communication Scale for Older Adults (CSOA) which directly assesses an individual's use of communication strategies and his or her attitudes towards hearing loss and perceived attitudes of others towards hearing loss

(continued)

Table 2. Continued.

Study; country	Goal of study	Design	Sample and Age	Measures	Intervention Outcomes
Sanchez et al. 2017; United States of America	To assess the feasibility of training community health workers (CHW) about hearing loss (Freire Empowerment Education Model) as a possible approach to increase accessibility of hearing health support services in an underserved area.	Mixed methods, quasi-experimental	Spanish-speaking CHWs employed by the federal qualified health centre in Santa Cruz County, Arizona ($n = 12$)	Thematic analysis of focus group discussions, case study discussions and self-reported measures	(1) Focus groups to assess awareness of issues related to hearing loss among their clients, identify CHW training needs, rated the usefulness of the information on topics, such as hearing loss, audiometry, and communication strategies, and the ease or clarity of the information (2) Knowledge-based questions that allowed the academic partners to assess the CHWs' competency in hearing loss-related concepts
Suen et al. 2021; United States of America	To describe a novel curriculum (HEARS intervention) through transdisciplinary collaboration to train older adult lay community members as interventionists to deliver hearing care with over-the-counter technology.	Mixed methods, Pretest-Posttest	Older adults with hearing loss ($n = 14$) Trainees for delivering programme ($n = 6$)	Self-reported measures; face to face assessments; assessment telephone calls	(1) Hearing handicap as measured by the Hearing Handicap Inventory for the Elderly-screening version (HHIE-5) (2) Older adults' satisfaction with the HEAR programme
Vreeken et al. 2020; The Netherlands	Dual Sensory Loss (DSL) protocol—To investigate the effectiveness of DSL protocol on communication for older adults with hearing loss and its effectiveness on their wellbeing.	Quantitative, Randomised Control Trial	Older adults with hearing impairment ($n = 131$); median age 76 years Chosen communication partner ($n = 113$)	Self-reported measures	In older adults with hearing loss: (1) Communication Strategies domain of the CPHI assesses coping behaviour in communicative situations related to hearing impairment Communication Profile for the Hearing Impaired (CPHI) (2) Personal adjustment to hearing loss was measured with the Personal Adjustment domain of the CPHI (3) Depressive symptoms were measured with the Centre for Epidemiological Studies—Depression Scale (CES-D) (4) Loneliness, as measured with the 11-item De Jong Gierveld Loneliness Scale In communication partners: (1) Attitudes of communication partners towards the hearing impaired participant were assessed using the 10-item Hearing Handicap and Disability Inventory (HHDI) (2) well-being of communication partners of DSL-patients was evaluated with the Care-related Quality of Life—7 Dimensions (CarerQoL-7D)

Study characteristics

Table 2 summarises the characteristics of the studies included in this review. The studies were conducted in the United States of America ($n=6$), Netherlands ($n=3$), Canada ($n=1$), Germany ($n=1$), Iran ($n=1$), and Australia ($n=1$). The study designs used included randomised controlled trials ($n=5$; Ghazavi et al. 2016; Kramer et al. 2005; Meijerink et al. 2022; Nieman et al. 2017; Vreeken et al. 2020), a non-randomised controlled trial (Preminger 2003), pretest-posttest design studies ($n=3$; Kruse et al. 2021; Pisano and Miller 2018; Suen et al. 2021), and other quasi-experimental design studies ($n=3$; Lock 2003; Mathews et al. 2011; Meyer et al. 2020; Sánchez et al. 2017). Most studies employed quantitative methods, but several employed a mixed methods approach ($n=4$; Lock 2003; Mathews et al. 2011; Meyer et al. 2020; Sánchez et al. 2017; Suen et al. 2021).

Types of interventions

Table 2 summaries the characteristics of the various interventions used in each study. Of the included studies, six studies involved a specific education programme based on improving communication skills of adults without hearing loss (Kramer et al. 2005; Kruse et al. 2021; Lock 2003; Mathews et al. 2011; Pisano and Miller 2018; Sánchez et al. 2017). The remaining seven studies detailed interventions aimed at improving communication involving older adults with HL, rather than implementing dedicated educational programmes solely for individuals without hearing loss (Ghazavi et al. 2016; Meijerink et al. 2022; Meyer et al. 2020; Nieman et al. 2017; Preminger 2003; Suen et al. 2021; Vreeken et al. 2020).

Study participants

Seven studies involved individuals who knew or were involved in caring for older adults with ARHL i.e. primary care givers, spouses, family members or a communication partner of their choice (Ghazavi et al. 2016; Kramer et al. 2005; Meijerink et al. 2022; Meyer et al. 2020; Nieman et al. 2017; Preminger 2003; Vreeken et al. 2020). One study involved care workers or experts working in the area of deaf communication (Sánchez et al. 2017), two studies focused on medical students (Kruse et al. 2021; Lock 2003), and two studies involved pharmacy students (Mathews et al. 2011; Pisano and Miller 2018). Only one study used volunteer trainees (Suen et al. 2021), however, they were from the same housing organisation as the clients with HL involved in the study, so it is unclear whether they were completely unknown to them. Therefore, none of the studies targeted the general population to help them improve their communication with older adults with ARHL.

Description of interventions

Focus of intervention

Eleven studies focused on increasing communication for older adults presenting ARHL (either alone or in a wider hearing impairment or deaf context) who had no other reported comorbidities (Ghazavi et al. 2016; Kramer et al. 2005; Kruse et al. 2021; Lock 2003; Mathews et al. 2011; Meijerink et al. 2022; Nieman et al. 2017; Pisano and Miller 2018; Preminger 2003; Sánchez et al. 2017; Suen et al. 2021), one study aimed to improve communication for people with ARHL which coincided with dementia (Meyer et al. 2020), and one study set out to

improve communication for older adults presenting with dual sensory, ARHL and vision loss (Vreeken et al. 2020).

Mode of delivery

Eight interventions were in person (Ghazavi et al. 2016; Lock 2003; Mathews et al. 2011; Meijerink et al. 2022; Nieman et al. 2017; Preminger 2003; Sánchez et al. 2017; Suen et al. 2021; Vreeken et al. 2020), three interventions were delivered via training videos, watched in the participants' home (Kramer et al. 2005; Kruse et al. 2021; Pisano and Miller 2018). Two studies involved a mixture of in-person and video-based sessions (Meijerink et al. 2022; Meyer et al. 2020).

Outcome measures

Eight studies completed post-intervention self-report surveys to assess the impact of the intervention (Ghazavi et al. 2016; Kramer et al. 2005; Kruse et al. 2021; Nieman et al. 2017; Pisano and Miller 2018; Preminger 2003; Vreeken et al. 2020; Suen et al. 2021) and two studies conducted a post-intervention interview (Meyer et al. 2020; Sánchez et al. 2017).

Furthermore, eight studies included follow up at a later date, ranging from three months to two years post intervention to reassess the impact of their intervention (Ghazavi et al. 2016; Kramer et al. 2005; Meyer et al. 2020; Nieman et al. 2017; Suen et al. 2021; Vreeken et al. 2020).

Outcomes focused on post-intervention changes in communicative function (Kramer et al. 2005; Kruse et al. 2021; Meyer et al. 2020; Nieman et al. 2017; Preminger 2003; Suen et al. 2021; Vreeken et al. 2020) and changes in knowledge and attitudes regarding hearing loss (Kramer et al. 2005; Kruse et al. 2021; Lock 2003; Mathews et al. 2011; Pisano and Miller 2018; Sánchez et al. 2017). Other studies focused on various measures of social and emotional functioning (Ghazavi et al. 2016; Meijerink et al. 2022; Nieman et al. 2017; Preminger 2003; Vreeken et al. 2020). Satisfaction with the intervention was measured across several studies (Kramer et al. 2005; Lock 2003; Mathews et al. 2011; Meijerink et al. 2022; Meyer et al. 2020; Nieman et al. 2017; Pisano and Miller 2018; Suen et al. 2021).

Multicomponent vs single component

The thirteen interventions were divided into two groups, described as multicomponent and single component. Multicomponent interventions were typically conducted over multiple sessions ranging from weeks to years in duration. The studies which had a single component intervention were conducted within one allocated session or appointment.

Multicomponent interventions

Ten of the thirteen interventions were considered multicomponent interventions. These interventions consisted of numerous training sessions, education classes, home education programmes, web-based programmes, and university modules. The number of sessions varied between one session per day for one week and one session per week for one hundred and four weeks. Sessions were delivered privately for individuals with ARHL and their family members, and were delivered as part of a large group or were class based. Five interventions were delivered via in person class or training workshops (Mathews et al. 2011; Preminger 2003; Sánchez et al. 2017; Suen et al. 2021; Vreeken et al. 2020), four interventions were delivered in a hybrid fashion

using remote support and in person sessions (Lock 2003; Meijerink et al. 2022; Meyer et al. 2020; Nieman et al. 2017), and one intervention was delivered fully online in an interactive conference style workshop (Kruse et al. 2021).

Single component interventions

Out of the thirteen interventions assessed, three comprised a singular type of intervention. These interventions are face-to-face interviews, workshops, training sessions, or scenario-based exercises. One intervention involved pharmacy students, which was delivered through videos distributed online (Pisano and Miller 2018). The other two interventions involved providing educational training sessions on communication skills to family members and significant others of an older adult with ARHL. Ghazavi et al. (2016) delivered their intervention through in person sessions, while Kramer et al. (2005) delivered their intervention remotely in the participant's home using self-directed learning with prescribed materials and remote support via video or phone call.

Thematic analysis

Five main themes were identified from these thirteen studies: (1) Education and communication skill training; (2) Model of intervention delivery; (3) Appropriateness of the intervention and satisfaction among participants; (4) Transforming attitudes on hearing loss for better relationships and emotional well-being.

Education and communication skills training

Education involved the provision of information to facilitate care and understanding towards older adults with ARHL. Communication skill training refers to the various ways in which interventions attempted to address communication breakdowns involving adults with ARHL. Each study described how the individual intervention implemented various strategies to educate or improve skills; these included engagement projects for families and community members, highlighting the communicative difficulties experienced by people with HL, and educating others about the changes they can make to improve the care they offer to adults who have ARHL (Kramer et al. 2005; Meijerink et al. 2022; Nieman et al. 2017; Sanchez et al., 2017; Suen et al. 2021). Across several studies reviewed, participants expressed a desire for formal education and communication training, or sought further training opportunities (Kruse et al. 2021; Lock 2003; Mathews et al. 2011; Sanchez et al. 2017; Vreeken et al. 2020). In some cases, these studies were conducted with medical students and they were requesting that communication skills involving individual with hearing loss should be incorporated into medical curricula (Lock 2003; Kruse et al. 2021). In other cases, volunteers (Mathews et al. 2011) and community health workers (Sanchez et al. 2017) expressed desire for further communication skills or sign language training.

Mode of intervention delivery

Some of the interventions were conducted remotely or using a hybrid format. Several studies which described electronic or online interventions investigated if the lack of face-to-face contact and interaction impacted participant learning (Kramer et al. 2005; Kruse et al. 2021; Meyer et al. 2020; Meijerink et al. 2022). In the study by Kruse et al. (2021), the online workshop format was deemed an effective alternative to face-to-face learning. In

contrast, Meijerink et al. (2022) reported that for their web-based SUPR programme, "for all types of videos, > 75% of the communication indicated they had not watched them" suggestive of poor engagement with course resources. Kramer et al. (2005) and Meyer et al. (2020) described studies conducted via telehealth, where the programme was delivered via training videos which were made available to participants for a specified time frame to allow for completion. In the study by Meyer et al. (2020), participants reported the benefits of being able to rewatch video content after the course had formally ended, and their preference for video content over written text. However, Kramer et al. (2005) noted that one limitation of the telehealth mode of delivery is that it may not be appropriate for less technologically literate individuals. In contrast, Nieman et al. (2017) implemented a community-based model, where the intervention was delivered in person by trained older adult community health workers (CHWs) (i.e. peers). This peer-led approach aimed to create a supportive and interactive learning environment within the community. The HEARS programme (Nieman et al. 2017) was structured to integrate communication strategies training and low-cost amplification devices, with CHWs providing individualised guidance and support, ensuring accessibility for participants who may have faced challenges engaging with technology-based interventions.

Appropriateness of the intervention and satisfaction among participants

Most studies ($n = 10$; Kramer et al. 2005; Kruse et al. 2021; Lock 2003; Mathews et al. 2011; Meijerink et al. 2022; Meyer et al. 2020; Nieman et al. 2017; Pisano and Miller 2018; Sánchez et al. 2017; Suen et al. 2021) placed a significant amount of focus on the appropriateness and acceptability of their interventions and attempted to evaluate if their interventions educated participants about ARHL and trained participants on how best to communicate with individuals with ARHL. There were two elements to this component: how satisfied the participants personally were with the training, and how likely they would recommend communication training to others.

Transforming attitudes on hearing loss for better relationships and emotional well-being

A prominent and consistent goal across many interventions was to change the attitude and perceptions of people towards HL in general as well as older adults with ARHL. In particular, interventions aimed to change perceptions of hearing loss, apprehension towards communicating with those who are hard of hearing, and enhance understanding of the psychological consequences of poor communication for adults with ARHL. Interventions were also concerned with evaluating the emotional benefits adults with ARHL gained following participating in several interventions. Two studies examined effects of intervention on depressive symptoms (Ghazavi et al. 2016; Vreeken et al. 2020) or loneliness (Vreeken et al. 2020). Other studies evaluated emotional and social wellbeing based on domains/sub-scales of communicative function scales (Nieman et al. 2017) or bespoke measures (Kramer et al. 2005). Several studies also examined intervention effects on quality of life in older adults (Nieman et al. 2017; Vreeken et al. 2020) and their communication partners (Vreeken et al. 2020).

Discussion

This scoping review summarised interventions aimed at educating people without hearing loss to better communicate with older adults who have ARHL. Participants across the thirteen studies included in this review consisted of primary caregivers, spouses, family members, communication partners, care workers, experts working in the field of deaf communication, medical students, pharmacy students and volunteers. Four intervention-related themes were generated: (1) education and communication skills training; (2) mode of intervention delivery; (3) appropriateness of the intervention and satisfaction among participants; (4) transforming attitudes on hearing loss for better relationships and emotional well-being. Interventions summarised in this review focused on educating and training people without hearing loss and people with ARHL with various communication strategies, increasing awareness of communication challenges faced by those who have HL, and increasing quality of communication involving individuals impacted by HL. Overall, results of the thirteen studies reviewed yield predominantly positive levels of satisfaction with these interventions.

Seven interventions focused on improving communication abilities for people without hearing loss only (Sánchez et al. 2017; Mathews et al. 2011; Pisano and Miller 2018; Kruse et al. 2021; Lock 2003). This is in direct contrast to much of the existing HL rehabilitation, which places the onus solely on the individual with ARHL. Heine et al. (2002) reported that people with ARHL frequently experience communication breakdown in the presence of background noise or group situations, whereas individuals without hearing loss felt background noise was not a contributor to conversational difficulties. This highlights the disparities between the two groups and the need for education and training to be provided to a wider population beyond that of just individuals with ARHL.

Results of the review found that, when asked, participants stated that formal education-based interventions (i.e. consisting of classes, sessions, or online training videos) were beneficial in teaching participants how best to implement various communication strategies and skills (Kramer et al. 2005; Ghazavi et al. 2016; Meyer et al. 2020). This finding is supported by Owens and Telleen (1981) and Tye-Murray (1991) who called for a more structured guide in the use of conversational repair strategies to be provided to those communicating with adults with ARHL to resolve conversational breakdowns.

Identifying the mechanisms of action is a key aspect when applying or adapting intervention programs to other contexts. In this review, a number of intervention-based studies employed the HEARS intervention (Nieman et al. 2017; Suen et al. 2021). Grounded in social cognitive theory, the intervention's primary behavioural change mechanism is focused on enhancing participants' self-efficacy in using communication strategies and integrating the amplification device into their daily routines. The HEARS program, in particular, showed that a structured, low-cost intervention could yield improvements in communication comparable to traditional clinic-based hearing care models (Nieman et al. 2022). An important factor contributing to its effectiveness may be the inclusion of peers from the community, fostering a supportive learning environment where individuals can provide and receive advice from others facing similar challenges (Southall et al. 2019). The long-term effectiveness of HEARS at 12 months suggests that peer engagement, combined with structured education, plays a vital role in sustaining communication improvements over time (Nieman et al. 2022).

Another structured programme that has been used to improve the communicative function of older adults with age-related hearing loss is the Active Communication Education (ACE) programme, developed by Hickson and colleagues (Hickson, Worrall, and Scarinci 2007; Hickson et al. 2019), which aims to enhance older adults' problem-solving skills, communication strategies, and the use of assistive technology. However, as the programme primarily focuses on improving the communication skills of individuals with ARHL rather than providing structured educational training for their communication partners, it did not meet the inclusion criteria for this scoping review. However, one module specifically focuses on communication with family members, examining the effects of communication breakdowns and identifying the skills necessary for improved communication. Existing studies describing ACE have not specifically examined the efficacy of the programme in communication partners but in the study by Hickson, Worrall, and Scarinci (2007), 36% of participants had a significant other who attended at least one group education session in the ACE group. Notably, the attendance of significant others at these sessions was not significantly associated with the program's outcomes. In another study which described the individualised version of the ACE programme (I-ACE; Hickson et al. 2019), significant others were encouraged to participate, and participants were prompted to discuss their hearing loss with their significant other(s), and certain sections included listening activities that required the involvement of a significant other. Structured, theory-driven programmes like HEARS and ACE are important because understanding their mechanisms of action helps to inform the systematic development of more effective interventions targeting communication involving older adult with ARHL.

Practice and policy implications

Despite the significant impact ARHL can have on the QoL of older adults and their communication partners, this review has demonstrated that there is not an abundance of widely accessible educational initiatives aimed at improving communication between these two groups. Studies evaluating the impact of communication partner training on communication disorders have consistently shown that it effectively enhances communication activities and participation for individuals with these disorders when interacting with a trained communication partner (Folder et al. 2024; Simmons-Mackie, Raymer, and Cherney 2016). Such interventions have also been linked with improved psychosocial outcomes across these conditions (Morris et al. 2018; Simmons-Mackie, Raymer, and Cherney 2016). Thus, interventions that target bridging the communication gap between individuals with differing hearing abilities hold promise for enhancing the QoL for everyone involved.

It has been reported previously that phonemic, content-related, and contextual factors can contribute to miscommunication and medical error in hospital settings among older patients with ARHL (Cudmore et al. 2017; Mick, Foley, and Lin 2014). However, several of the studies reviewed here report that health-care professionals are not consistently provided with training on effective communication with patients who are hard of hearing. Existing interventions have focused on upskilling caregivers and medical/pharmaceutical students (Mathews et al. 2011; Pisano and Miller 2018; Lock 2003), rather than bespoke interventions designed for more experienced hospital-based clinicians. Therefore, we highlight the need for both ongoing refinement of educational offerings, as well as the development of interventions

targeting the communications skills needs of other types of health professionals, especially those working in specialties which involve frequent interactions with older adults with ARHL (Sánchez et al. 2017; Kruse et al. 2021;). Medical students who participated in the intervention described by Kruse et al. (2021) felt more specific training was needed within the academic curriculum in their respective universities.

It is particularly important for healthcare professionals to have the skills needed to effectively communicate with hard-of-hearing patients. Effective communication is a cornerstone of quality healthcare, as it directly impacts patient satisfaction, adherence to treatment, and overall health outcomes (Nieman et al. 2017; Ratna 2019). The HEARS intervention, a community health worker (CHW)-delivered hearing care program, demonstrated that structured education and amplification support can significantly improve self-perceived communication function in older adults with hearing loss (Nieman et al. 2022). These findings underscore the importance of accessible, community-based models in enhancing communication between patients with hearing loss and healthcare providers.

This review suggests that developing and implementing an educational programme targeting healthcare workers, caregivers, and individuals interacting with older adults who have ARHL can offer multiple benefits. Educational programmes tailored towards individuals with unimpaired hearing offer an efficient and accessible approach, when compared to alternatives such as technology-based solutions (Kramer et al. 2005; Meijerink et al. 2022; Meyer et al. 2020). By educating healthcare workers, caregivers, family members, and the general public about the communication challenges faced by adults with HL and providing strategies to overcome these obstacles, a more inclusive and understanding communicative environment can be fostered (Langarizadeh et al. 2017). Additionally, the incorporation of telehealth in several interventions highlights the potential accessibility of future programmes based on this format for practice and implementation (Kramer et al. 2005; Meijerink et al. 2022; Meyer et al. 2020).

Future research

Individuals with HL may experience communicative breakdowns in a variety of situations including with family members, carers, the general public or medical professionals. As well as this, it is recognised that members of the deaf community and hard of hearing individuals experience barriers in the acquisition of health information (Harmer 1999; Steinberg et al. 2006; Barnett 2002). In response to the results of this scoping review, the researchers propose that the next phase of research should involve the design, implementation, and evaluation of structured and theory-driven educational programmes purposefully crafted to bridge the communication gap between clinicians, caregiver, the general public and the ageing population impacted by ARHL (Langarizadeh et al. 2017; D'Haese et al. 2018). It is recommended that intervention outcomes should not be restricted to evaluation of participants' attitudes and skills but should extend to study of their behaviour and benefit to the organisation or individuals with ARHL (i.e. levels three and four of Kirkpatrick's evaluation framework 1994).

These programmes should also highlight the barriers which impede effective communication in general contexts and particularly within clinical settings (Ratna 2019), and should provide various strategies and tools aimed at mitigating and ultimately eliminating these communication barriers. Furthermore, they

should serve as a vital informational resource for healthcare workers (and the general public), arming them with the requisite knowledge and tools to effectively engage with and provide care for their hearing loss patients (Langarizadeh et al. 2017). The implementation of such educational programmes would mark a significant step forward in delivery of quality healthcare as well as improving the overall QoL for those affected by ARHL (Taljaard et al. 2016; Fook and Morgan 2000; Lin and Albert 2014).

Limitations

A number of the studies described interventions which were not designed to address the diversity of people with hearing loss, with communication strategies not tailored to address the impact of ageing on the auditory system and related cognitive functions. This scoping review may act as a precursor for a systematic review which will extend beyond summarising existing intervention-based studies to evaluating the quality of included studies

Conclusion

The onus for effective communication should not solely rest on those experiencing HL (Ratna 2019). Communication is reciprocal, a two-way street. Therefore, expecting only individuals with HL to adapt their communication methods can lead to isolation and reduced participation in various aspects of life, including in healthcare settings. It is the responsibility of healthcare professionals, and wider society, to take an active role in addressing this challenge (Nieman et al. 2017). This review suggests that developing and implementing an educational programme targeting healthcare workers, caregivers, and individuals interacting with older adults who have ARHL can foster a more inclusive and understanding communicative environment (Langarizadeh et al. 2017). Educational programmes tailored towards individuals with unimpaired hearing offer an efficient and accessible approach, when compared to alternatives such as technology-based solutions (Kramer et al. 2005; Meijerink et al. 2022; Meyer et al. 2020). Additionally, the incorporation of telehealth in several interventions highlights the potential accessibility of future programmes based on this format for practice and implementation (Kramer et al. 2005; Meijerink et al. 2022; Meyer et al. 2020). The current review adds to the existing body of literature which finds interventions based on communication and education are beneficial and also calls for interventions to be developed which are aimed specifically at patient-facing health professionals.

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