Hearing and Cognitive Impairment and the Role of the International Classification of Functioning, Disability and Health as a Rehabilitation Framework

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ABSTRACT

The International Classification of Functioning, Disability and Health (ICF) has been applied widely in the literature to describe and differentiate the broad implications of hearing impairment (HI) and cognitive impairment (CI) on communication. As CI and HI are largely age-related conditions, the likelihood of comorbidity of these conditions is high. In the context of an aging population, the prevalence of comorbidity is likely to rise, yet much of the clinical assessment and intervention in HI and CI occur separately. The benefit of addressing the dual impact of these conditions is of increasing clinical importance for all clinicians working with older adults and for audiologists and speech pathologists in particular. In this article, the ICF model will be applied to explore the everyday implications of HI and CI. Furthermore, the clinical implications of the ICF model are explored with particular respect to communication assessment and intervention options. The potential benefit of combining activity- and participation-focused interventions currently offered for HI and CI independently is examined.

KEYWORDS: Communication, cognitive impairment, hearing impairment, WHO-ICF, rehabilitation

Learning Outcomes: As a result of this activity, the participant will be able to (1) describe how the World Health Organization’s International Classification of Functioning, Disability and Health model may be applied to

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better understand the implications of cognitive impairment (CI) and hearing impairment (HI) as they occur independently and with regards to their co-occurrence; (2) describe HI as it occurs at the impairment level and how it affects activity and participation; (3) describe CI as it occurs at the impairment level and how it affects activity and participation; (4) describe the possible mechanisms of co-occurrence of HI and CI at an impairment level and identify how this co-occurrence may influence activity and participation; (5) describe how an individual's context (personal and environmental) influences their experience of activities and participation; (6) describe the benefit of current psychosocial intervention programs, making reference to the ICF model.

Hearing impairment (HI) and cognitive impairment (CI) are both highly prevalent among older adults. Population-based studies report that more than 60% of adults over the age of 70 have HI. In this same age bracket, almost 14% of adults have dementia. Furthermore, a growing body of research identifies an association between HI and dementia. Indeed, research indicates that dementia occurs in 17% of community-dwelling adults with mild HI and 28% of adults with moderate HI.

CI and HI each manifest as communication difficulties leading to critical participation restrictions for the individual with HI/CI and by extension for caregivers and/or communication partners. Yet, HI and CI are currently the focus of very different assessment and therapy regimens. The motivation for this article lies in the interplay of communicative issues that arise when HI and CI co-occur in older adults and the possibility that functionally oriented intervention combining key therapeutic goals for each may enhance outcomes for individuals with HI and CI and for those around them.

Although intervention for CI has a distinctly functional focus, the focus of intervention for HI among older adults still relies primarily on clinical assessment of auditory impairment. Recent research findings herald a change in focus for intervention in HI toward biopsychosocial therapy models. This article will use the World Health Organization’s International Classification of Functioning, Health and Disability (ICF) framework to demonstrate how clinicians may address the full impacts of HI and CI to improve outcomes for patients, their families, and significant others.

The structure of the ICF framework (discussed in detail in articles within this edition, see especially Meyer, Grenness, Scarinci, and Hickson) will be used to distinguish service delivery offered at the level of body functions and structures with that of activities and participation associated with HI and CI each individually and then in the context of comorbidity. Contextual factors will be addressed with a particular focus on the comparison of community and formal care environments. This article reflects recent research concerning the diverse range of impacts that adult-onset HI has on individuals and those around them. These issues have been raised on many previous occasions using the ICF as a guiding model and methodology. The authors hope that in doing so, professionals involved in the care of someone with CI and concomitant HI will be prompted to consider the interplay between each impairment and their combined impact when planning intervention with these individuals and their families.

DIFFERENTIATING HEARING AND COGNITIVE IMPAIRMENT BODY FUNCTION AND STRUCTURE AND ACTIVITIES AND PARTICIPATION

This section provides a brief overview of the changes to structure and function typically reported in HI and CI and the manner by which these changes impact on everyday communication.
Hearing Impairment
Peripheral HI arises from pathologic changes to the structure and function of the peripheral hearing mechanism—from the outer ear to the cranial nerve. Of key interest to this article are the consequences, particularly reduced access to communication in difficult or adverse environmental conditions, of the loss or diminution in perceptual abilities, commonly suggested to arise from changes in cochlear function.13,14 Assessment in adult rehabilitative audiology has been driven largely by clinical evaluations of perceptual skills, typically hearing thresholds via the audiogram and speech reception scores via standard auditory-only speech testing methods. However, the decision to undertake audiological assessment and intervention is based on perceived needs (embedded in everyday psychosocial issues related to participation) rather than on measured impairment of structure or function.15 Neither pure tone nor speech audiometry provides particularly pertinent insights into the functional needs of clients with adult onset/acquired HI because neither (1) is a good predictor of clients’ attendance at clinic nor of their expectations, (2) addresses functional communicative outcomes, and (3) correlates well with psychosocial measures of motivation, self-efficacy, or health beliefs, for instance.

At activity and participation levels, HI manifests most significantly as a loss or reduction of competence in everyday spoken communication. The most common assessment of this is via self-reported activity limitations and participation restrictions. Audiology clinics have access to a very large number of validated self- and other-report questionnaires that address activity and participation (see Meyer et al, this issue). Commonly, adults with HI report difficulty in a range of social activities, including communicating in background noise, especially in large-group settings, over the telephone, with strangers, or in settings requiring extended periods of listening (e.g., lectures, theater, or cinema).16 These communication difficulties can lead to multiple negative consequences, including poorer quality of life, social isolation, and depression.17–19 Family members also experience similar, negative psychosocial sequelae.20–22 Although adults’ perceptions of communication difficulty arising from their HI have been widely reported, it is only recently that research into self- and other-reported perceptions of communication have been supported by observational studies of patterns of communication between adults with HI and their familiar communication partners. Lind,23 Skelt,24 and Pajo25 identified several common sites of conversational behavior that are influenced by the presence of adult-onset HI. The primary focus of these studies has been on whether patterns of breakdown and repair in conversation involving an adult who has acquired HI are atypical and, if so, whether they reflect the impact of the HI on everyday conversation. These observational studies offer evidence of the manner by which conversation difficulties arise and subsequently how they are addressed and/or resolved. They further suggest that certain patterns of breakdown and repair are indeed atypical and as such are valid candidates for intervention programs.20–22

Cognitive Impairment
CI and dementia result from pathologic structural changes to the central nervous system, with associated functional changes. Dementia is caused by widespread cortical atrophy, often in basal forebrain areas, and consequent enlargement of the ventricles and shrinkage of the hippocampus.26 Dementia has several forms, differentiated by the cause of neuronal atrophy. The most common cause of dementia is Alzheimer disease (AD), accounting for 60 to 80% of all cases.27 The pathologic changes associated with dementia lead to structural impairments, resulting in functional, activity level changes such as learning and memory impairment, complex attention deficits, language and social cognition impairment, perceptual-motor changes, and the disturbance of executive function (planning, organizing, sequencing, abstracting).28 These cognitive functions, in particular memory, have an impact on communication and language abilities. Typically, people with dementia present with poor auditory comprehension and word-finding difficulties arising from compromised language processing and working memory.29–31 People with CI also experience difficulties with conversation. For
example, individuals with CI may experience difficulties in conversation associated with repair,32,33 topic shifting and topic management,34–36 and turn taking.37,38

Diagnosis of dementia (body functions and structures) can only be confirmed through a comprehensive cognitive assessment and a post-mortem examination of the brain. Therefore, current diagnoses are incomplete and largely generalized. Clinically, there are several widely used tools that screen basic cognitive functions, including the Mini-Mental State Examination (assessment of orientation, registration, attention and calculation, recall, language), the Modified Mini Mental Exam, and Montreal Cognitive Assessment (assessment of visuospatial, naming, memory, attention, language, abstraction, delayed recall and orientation abilities).39–41

Among the assessments for CI and dementia, a number can be used to evaluate communication difficulties (activity and participation) including the Arizona Battery of Communication Disorders in Dementia,42 Perception of Conversation Index—Dementia of the Alzheimer Type,43 and the Environment and Communication Assessment Toolkit for Dementia Care.44 Each assessment has a unique focus. The Arizona Battery of Communication Disorders in Dementia focuses on receptive language (e.g., following commands, reading comprehension) and expressive language (e.g., object description, naming) in the context of other cognitive functions.42 By contrast, the Perception of Conversation Index—Dementia of the Alzheimer Type explores family members’ perceptions of communication difficulties between themselves and the person with dementia, potential sources of anxiety and frustration associated with communication problems, and communication strategies that are supportive and useful in reducing the communication-related aspects of caregiving stress.43 The Environment and Communication Assessment Toolkit for Dementia Care, on the other hand, considers potential environmental changes (i.e., consideration of lighting, background noise, environmental cues, and visual distracters) that may be made to care settings in particular to enhance communication with individuals with dementia.44

**Co-occurrence of Hearing and Cognitive Impairment**

Communication challenges are known to increase when HI and CI co-occur,45 and people with dementia in particular can experience excess disability.46,47 Slaughter and Bankes describes excess disability in the context of a Functional Transitions Model as a more rapid decline in function than may be anticipated as a result of additional disability unrelated to dementia.47 In this way, the presence of HI, for instance, may exacerbate preexisting communication difficulties related to dementia.46,47

The concept of excess disability has been reported to be context dependent and to manifest differently for those who remain at home and those who live in residential aged care facilities (RACFs). In RACFs, excess disability as a result of HI has been reported to impact the quality of care that professional caregivers are able to provide to people with dementia.46 Family caregivers are likely to experience similar excess disability, but to date this has not been fully explored. The impact of setting will be addressed in more detail later in this article.

Frank Lin and colleagues have been influential in the research of both impairment- and activity- level association of HI and CI. With regards to impairment level associations between HI and CI, Lin et al conducted a neuroimaging study demonstrating acceleration of whole brain atrophy and volume changes in participants with HI compared with participants with normal hearing.48 Atrophy was found in temporal regions of the brain, those regions largely responsible for semantic memory, processing language, and sensory integration. Similarly, Murman indicated that general neurophysiological degeneration with age may have its impact across structures that influence cognitive and age-related sensory loss.49 Kurylo et al, on the other hand, suggested no direct link between the anatomical physiologic substrates of AD in particular and the primary auditory cortex.50 They suggested that loss of receptive language function in AD is not associated with loss of auditory areas of the cortex. Further research is needed to understand more fully the links between hearing loss and cognitive decline at an impairment level.
Activities and Participation

At an activity level, research by Lin and colleagues revealed that participants with greater HI performed more poorly on nonverbal cognitive and psychomotor processing tasks and memory and executive function tasks than those without HI. Lin and colleagues also found positive correlations between the severity of hearing loss and both the incidence of all-cause dementia and the rate of cognitive decline as measured with activity-based assessments.

Research by others has addressed the relationship between auditory processing and cognitive capacity, especially executive functioning, in older adults. The impact of auditory processing abilities on cognitive processing may be noticed in as early as middle age and may share some pathologic processes with CI. Although Gates et al noted that primary auditory function (i.e., from the peripheral hearing mechanism to the temporal lobe) was not associated with reduced cognitive processing, it has been reported that decline over time in cognitive processing may be associated with a decrease in auditory threshold. Anstey et al also reported a weak association in rate of change of peripheral hearing and memory for older adults. The relationship between decline in cognition and hearing in older adults remains only partially understood and awaits confirmation and further development.

Mechanisms of Association

Although there has long been evidence that either or both peripheral and central auditory impairment have been associated with cognitive decline, and both co-occur as age increases; no one of these studies identifies a causal relationship. Fulton et al suggested several models/mechanisms to which the association between HI and CI might be attributed. Possible mechanisms related to co-occurrence of impairment include generalized neural degeneration and combined cognitive and sensory degradation. By contrast, the primary activity-oriented interpretation is based on cognitive resource allocation. Pichora-Fuller et al theorized that greater cognitive load associated with listening under conditions of reduced peripheral or central auditory function may result in more rapid cognitive decline, closely aligning with the cognitive resource allocation theory of Fulton et al. Dupuis et al suggested that test protocols that commonly rely on vision and hearing for their successful completion may be compromised by the presence of sensory impairment.

Although neither the depth nor the mechanism(s) of association is fully understood, it is of increasing importance among researchers and clinicians as well as caregivers at home and in RACFs that the co-occurrence of these two impairments be effectively addressed. The potential causal relationship remains to be investigated, to determine whether hearing loss might be an early marker or cause of dementia and if so, whether the reduction in impairment associated with hearing loss might reduce the risk of either developing dementia or exacerbating dementia-related symptoms.

Environmental Contextual Factors

Unlike traditional medical or rehabilitation approaches to health care, the ICF model recognizes that the environment in which an individual resides is an important consideration for health professionals as a limiting or enabling factor in providing care. Individuals with HI and/or dementia may be community-dwelling or may be living in various types of care, typically RACFs. RACFs are of particular interest to this discussion as communication difficulties among aged care residents are frequently attributed to HI and CI, rates of dementia and HI in the RACF population are high, and the number of older adults residing in RACFs could be expected to surge in the coming years in Australia. Appropriate allocation of therapy resources that are sensitive to the potential for comorbidity of CI and HI within RACFs will be critical as these numbers increase. In this discussion, a distinction will be made between physical environmental factors and social environmental factors in both the community and in RACFs as they might impact on older adults with CI and HI who are residents in these facilities.
Physical Environmental Factors
Quality of communication is most significantly impacted by physical environmental factors of noise (both signal-to-noise ratio and reverberation), as well as lighting and distance between the source and the listener. Community-dwelling adults are typically able to manipulate these factors in the home environment, whereas individuals in a care environment are largely unable to control these factors. Because of this, the design of the built environment has come under focus in recent years, with the aim to improve outcomes and quality of life of individuals with dementia in residential care in particular.66–68

A recent review of the impact of the care environment on individuals with dementia found that specific design interventions considering basic facility design and environment (e.g., floor plan and layout including lighting and noise) and ambience for example can improve an individuals’ behavior, well-being, socialization, orientation, and care.67 As many of these environmental factors might impact on individuals with HI as well, it is likely that these modifications (in particular lighting, noise, and visual signs) will have positive implications for individuals with HI also. Therefore, with increasing recognition of the impact of these factors in care settings, these problems can, and are beginning to, be considered in the design of new RACFs and the refurbishment of older RACFs, thereby minimizing the potential future impacts of these factors on interaction in care.

Social Environmental Factors
Community-dwelling adults have more frequent access to and control of communication with support from family. For example, in the community, an individual typically has a degree of control over social interaction (who to talk with, when, and how). However, in RACFs, an individual may not have this level of control. Formal caregivers are typically the most frequent communication partners. Therefore, the quality of an individual’s social experience is determined in large part by the characteristics, attitudes, and abilities of caregivers responsible for their care. An Australian study by Bennett et al found that personal caregivers believe that CI influenced the “nature of the services provided to the residents, as well as the ability of RACF staff and external service providers to uphold philosophies of care and meet legislative requirements.”69 (p.2004) Similarly, Tappen et al described how care workers often avoided conversation with individuals with dementia because of difficulty understanding them.70 They also reported that their communication with residents was adversely influenced by a lack of reciprocal communication. The impact of HI on the quality of residential care included loss of social contact and was often made worse by less than optimal hearing aid use.71 These difficulties are compounded by the complexities emerging from an increasingly multicultural aged care workforce, with the acknowledgment of the impact of cultural norms and language abilities (spoken and written) on communication and care.72

Societal/Institutional Environmental Factors
Societal factors such as access to health services are often determined by an individual’s environment. Within an RACF, health services are typically accessed internally, with limited choice offered to residents or their caregivers. By contrast, individuals managing CI and/or HI in the community can exercise their own choice in which services they access. Due to the institutional (often commercial and thus government regulated) nature of RACFs, care provision is shaped largely by aged care policies and guidelines to minimum levels of assessment, care, and quality of service provision, often limited by constraints in funding and resources.73 In addition, institutional culture can influence care provision in RACFs. Individual workplace/institutional culture has been described as the:

prevailing ideology that people carry inside their heads. It conveys a sense of identity to employees, provides unwritten and often unspoken guidelines for how to get along in the organisation, and it enhances the stability of the social system that they experience.74 (p.16)
This institutional culture varies between RACFs and has an impact on resident outcomes in the provision of long-term care.\textsuperscript{75–77} Similarly, organization-specific features such as daily routines, staff-to-resident ratios, and internal staff training may limit or enhance a care provider’s ability to identify and meet all residents’ individual communication needs and provide appropriate care.

**PERSONAL CONTEXTUAL FACTORS**

Although CI or HI is unlikely to affect personal factors such as social and/or cultural background, HI and CI may differ by the degree to which the impairment influences an individual’s insight into his or her difficulties and ability to adapt behavior. In the context of insight and language abilities that will “inevitably deteriorate as the disease progresses,”\textsuperscript{33 (p.80)} interventions requiring people with CI to learn new behaviors to accommodate their communication difficulties may be largely impractical. However, because HI is almost purely a receptive sensory difficulty, language abilities, insight, and learning are unlikely to be affected, and hence individuals with HI are able to share the load with a partner to accommodate their difficulties in communication.\textsuperscript{24,78} When HI and CI co-occur, the impact of the lack of awareness on communication associated with CI will influence communication difficulties arising across both domains.

**THIRD-PARTY DISABILITY**

Family members of individuals with CI and/or HI may experience third-party disability. Third-party disability refers to the effect of an impairment on a frankly unimpaired third party (e.g., partner, caregiver, or spouse of individual with the impairment).\textsuperscript{8} Research indicates that the third-party disability associated with HI affects a spouse with regards to a wide range of activity and participation.\textsuperscript{11} Scarinci et al found that HI impacts predominantly on a third party’s communication (e.g., frequent repetition, less frequent social chat) and activities of daily living (e.g., talking on the phone, watching TV).\textsuperscript{21} A systematic review of the consequences of HI on a conversation partner indicated that HI limits a conversation partner’s social opportunities, is associated with increased burden in communication, and decreases self-perception of quality of life and satisfaction in his or her relationship with the partner with an HI.\textsuperscript{79} More severe third-party disability is predicted by poor spouse-reported relationship satisfaction, difference in spousal age, and spousal rating of their partners’ disability.\textsuperscript{22}

Despite this obvious impact, Ekberg et al revealed that family members were rarely invited to join the discussion during clinical sessions, with audiologists tending to direct their communication to the client with HI.\textsuperscript{80} However, family members continued to demonstrate a strong desire to share their experiences of their partners’ HI within clinical sessions with an audiologist. The importance of family involvement in health care has been well recognized in pediatric medicine in particular,\textsuperscript{81} with the development of family-centered care models, involving and therefore empowering families of an individual with a certain health condition through facilitating his or her active involvement. The obvious impact on that HI has on everyday communication highlights the potential use of this model.

With regard to CI, third-party disability is likely to manifest as caregiver burden, to which communication partner burden is likely to contribute. Due to its widespread and pervasive impacts, CI often results in an individual requiring assistance in everyday self-care (see environmental factors above). The impact of time and effort required to provide this care as perceived by the care provider has been termed caregiver burden.\textsuperscript{82–84} Caregivers’ perceptions of burden vary widely but are mediated by several factors.\textsuperscript{85} Problem behaviors are associated with increased intention to institutionalize the care recipient (in RACFs) and high levels of burden are associated with an increase in caregiver suicidal ideation.\textsuperscript{86,87} Dauphinot et al reported that caregiver burden is associated with qualities of the care recipient, namely severity of CI, levels of functional autonomy, severity of behavioral disorders, and use of antidepressant medications.\textsuperscript{82} Sutcliffe et al found greater caregiver burden is predicted by caring for a parent, being female, increased time spent supervising the care recipient, high levels of psychopathology in the care recipient and a lack of caregiver support (informal, from family, and so on).\textsuperscript{88}
Communication partner burden in both HI and CI, on the other hand, occurs when caregivers are required to increase their efforts in structuring and maintaining a conversation in the face of the care receiver’s communicative difficulties. Research has shown, however, that communication partners do not instinctively know how to best support a partner with dementia in conversation, which may increase the perception of burden in conversation. Savundranayagam et al described the mechanism of this association. They identified problem behaviors as the source of caregiver burden (with regard to factors such as emotional strain and feelings of imposition on everyday life). Furthermore, they discussed how communication problems common in dementia trigger the problem behavior and thereby contribute (albeit, indirectly) to burden.

It is clear that communication difficulties can have a significant impact on a third party, as well as having potential flow-on effects for the individual with HI or CI. With regard to CI in particular, this can have implications on the care individuals receive. It is predicted that both caregiver and communication partner burden would increase with co-occurrence of CI and HI.

**ASSESSMENT AND INTERVENTION IN HEARING AND COGNITIVE IMPAIRMENT**

Granberg and colleagues reported the use of the ICF as an interpretative framework for understanding the impact of HI across all domains of human function and psychosocial activity. This work on the ICF categories as they might relate to adult HI identifies that aspects of participation spread more widely than are currently reflected in many of the self- and other-report scales in hearing health care. They include matters as diverse as human rights and economic self-sufficiency, alongside a wide range of communicative abilities and the personal and social settings in which individuals live and participate in social life.

The relationship between the ICF and HI identified by Granberg and others implies a wide range of issues of participation that might need to be canvassed in assessing the needs of adults with HI. Similarly, models of intervention in CI focus largely on activity and participation, as there is relatively little evidence of the efficacy of impairment-level intervention via drug regimens or other methods.

Allen et al suggested that for individuals with dementia who have mild hearing loss, hearing aids do not improve cognitive function or reduce behavioral or psychiatric symptoms. The presence of dementia, however, should not preclude investigation of the benefits that might be derived from a hearing aid or other device as they are well tolerated, and both caregivers and subjects report overall reduction in disability from HI. More broadly, the question remains to what extent acquired HI impacts CI in clinical assessments.

Recently, Lodeiro-Fernández et al identified that poorer audiometric thresholds adversely influenced verbal comprehension but not verbal production scores among adults aged 65 years and older who had mild CI. By contrast, HI was not found to influence language production or comprehension scores among adults with more severe dementia. Together, these results suggest that receptive language skills were more vulnerable to the presence of HI in assessing adults with lower levels of CI but played little role in the assessment of more severe dementia.

Currently, there are no assessments or interventions that explicitly address the dual impacts of co-occurring HI and CI. Typical management of these conditions involves ongoing monitoring and accommodation in the context of deterioration associated with both conditions. However, co-occurrence may impact individual performance assessments of HI or CI, as one may mask the other due to the communication disorders associated with both conditions. Similarly, strategies and interventions that have been proven effective for individuals with either compromised hearing or deteriorating cognitive abilities may be less effective when these conditions co-occur. Therefore, it is important that health professionals involved in the care of a person with CI or HI be cognizant of potential comorbidities. Outcomes for people with CI and concomitant HI, and their families, may be improved if future rehabilitation approaches are integrated and focus on functional improvement/participation.
COGNITIVE IMPAIRMENT, COMMUNICATION INTERVENTION, AND CAREGIVER EDUCATION

Third-party intervention is important in adult communication disorders such as those arising in HI and CI. Current models of intervention that engage either informal caregivers (e.g., family members, friends) or formal care providers differ, depending on context and whether roles are explicit or implicit. The most commonly reported education-related need of caregivers of people with CI, however, has been reported to be the development of effective caregiver-to-patient communication skills. Accordingly, several systematic reviews have been conducted to determine the effectiveness of communication training for adults with dementia. Each of these systematic reviews has highlighted that only a few high-quality randomized controlled trials have been conducted in this area. Nevertheless, it is clear that there is more evidence in support of interventions that have incorporated caregiver training, in contrast to those that have focused on the person with dementia only. For example, Egan et al reported that the use of memory books, supplemented by caregiver training, resulted in improved communication outcomes for the person with dementia (e.g., more utterances and more meaningful conversations). Similarly, Vasse et al reported positive changes to professional caregiver communication (e.g., improved communicative interactions between staff and residents and better nurse-patient cooperation) as a result of daily care intervention studies wherein professional caregivers were taught communication strategies.

In a more recent systematic review that focused specifically on communication training aimed at caregivers, Eggenberger et al reported several benefits of communication training. The authors reported that training for professional caregivers resulted in improved knowledge scores, more positive communicative interactions with residents (e.g., use of more positive statements and more respectful communication), greater satisfaction with communication with residents, and decreased depression among residents. Similarly, training aimed at informal caregivers of people with dementia made caregivers more cognizant of communication problems and resulted in improved caregiver knowledge of communication strategies, fewer communication problems, and an increase in quality of life for the person with dementia. There was less consistent evidence demonstrating an effect of communication training on challenging behavior in residents with dementia and little evidence demonstrating an effect of communication training on caregiver burden. These findings speak to the complex nature of dementia, but nevertheless highlight some key advantages of training caregivers of people with dementia in effective communication.

Some examples of interventions that have been developed for caregivers of people with dementia that specifically target communication include Memory Strategies in Dementia (RECAPS) and Communication Strategies in Dementia for Care Staff (MESSAGE), The Conversation Analysis Profile for People with Cognitive Impairment (CAPPCI), the Caregiver Training in Alzheimer’s Disease (FOCUSED) program, and the VIPS Communication Skills Training for Paraprofessional Dementia Caregivers.

RECAPS and MESSAGE are both integrated as part of a DVD-based program that demonstrates the use of strategies that have been reported in the literature to support memory (e.g., use of spoken and written reminders and consistent routines) and communication (e.g., use of short, simple language and visual aids) in people with dementia. The program was designed for both professional and family caregivers of people with dementia and can be used in isolation or incorporated as part of a group training program.

The CAPPCI is a participation focused intervention tool both for assessing a range of sources of interactional difficulty and for designing appropriate, individualized intervention for people with generalized CIs and their conversation partners. The CAPPCI is appropriate to use with individuals who do not have the insight or understanding to be able to complete formal assessments, and it is therefore ideal for use with individuals with CI.

The FOCUSED program was designed to provide caregivers with strategies to mitigate communication breakdowns when communicating with a partner with AD. A later study confirmed the efficacy of this training with the
addition of an observed transactional task (videotaped interaction). Similarly, the VIPS Communication Skills Training for Paraprofessional Dementia Caregivers emphasizes person-centered dementia care principles outlined by Brooker through workshop education provided to formal caregivers to individuals with dementia.

Overall, evidence suggests that caregivers of people with dementia want to receive more education about communication and that there are benefits of educating both professional and family caregivers. Several programs have been developed for this purpose, some of which have been described earlier. Importantly, however, we should highlight that the impacts of hearing loss on communication have rarely been considered within communication programs that have been developed for caregivers of people with dementia.

MODELS OF INTERVENTION IN HEARING IMPAIRMENT

As a consequence of the focus on the assessment of sensory-perceptual skills outlined previously, intervention for adult HI has traditionally been built on the remediation of sensory perceptual difficulties. The focus on the reception of another’s spoken signal without reference to the communication partner’s speech, language, or familiarity or the context in which the interaction took place implied the HI partner’s role as a passive recipient of another’s talk. In more recent years, three strong influences have changed the practice of (nontechnological) intervention for adults with acquired HI. The first of these is the impact of research into the psychological/psychosocial factors influencing rehabilitation. The second is the impact of research into patterns of everyday talk as they are affected by one person having an acquired HI. The third is the change of focus in rehabilitation toward patient- and family-centered care. The premise of participation-based rehabilitation for adults with HI is that everyday conversation is the most common source of reduced participation, and thus a logical goal for intervention. In turn, with the focus on participation-level interventions, therapeutic practices in HI and CI might be offered in a complementary fashion to the benefit of the individual with HI/CI and those around them.

FORMAL HEARING IMPAIRMENT REHABILITATION PROGRAMS WITH PSYCHOSOCIAL EMPHASIS

There remains a poorly understood link between HI, as sensory-perceptual impairment, and the impact of HI on everyday communication. Recent years have seen a new focus away from informing rehabilitation needs on the basis of an individual’s auditory capacity and toward his or her psychosocial needs. However, it is still the case that relatively few formal psychosocial rehabilitation programs exist for adults who have HI. By extension, only recently have tools been developed for the assessment of communication partner burden as a reflection of third-party disability in adult HI.

One of the earliest texts addressing adult HI in the context of everyday communication, authored by Kaplan et al., includes psychosocial exercises in manipulating physical and social environments, repairing communication breakdowns and assertiveness. Erber and Tye-Murray also promoted the practice of communication strategies including anticipatory strategies and strategies for repair. These texts use both massed practice and informational counseling as the vehicles for these interventions. Importantly, they also address communication strategies aimed at the communication partner, highlighting the need to interpret adult HI as a context- or situation-based communication difficulty.

The Active Communication Education group aural rehabilitation program developed by Hickson and colleagues engages adults with HI and their significant others in a range of communication scenarios, providing both massed practice of and informational counseling for a variety of communication strategies. Similarly, the Ida Institute has published a range of psychosocial clinical and teaching tools on its Web site (www.idainstitute.com). Clinicians are able to access support materials for individual and group-based rehabilitation programs for HI that support both counseling about and simulated practice of difficult communication settings.

Together, these texts and programs provide clinicians working with adults with HI and
their significant others with materials by which aspects of activity and participation related primarily to everyday communication may be addressed. It remains to be investigated whether these programs, alone or in conjunction with these outlined previously for individuals with CI and their families, might assist in ameliorating the excess disability associated with the communication difficulties arising when HI and CI co-occur.  

CONCLUSION

Although impairments to hearing and cognitive processes are distinct in most cases, their co-occurrence and possible association has been highlighted in recent research and is a matter of ongoing investigation. Overlap of the impact of HI and CI on activity limitations and participation restrictions, as a result of communication difficulties, is clear. It is important to note that the impact of CI has potentially much broader behavioral implications and impacts on activities of daily living to a much greater extent than does HI.

Older adults' loss of independence and increasing care needs arising from their CI may result in taking up residence in RACFs. The contextual factors referenced in the ICF model make it clear that those in residential care who present with both CI and HI are likely to experience the functional limitations arising from both impairments very differently from those who remain in the community.

Interventions addressing HI and CI have been developed in the context of the individual disorders, with CI having a longer history of functionally oriented intervention than HI. More recently, intervention for HI are increasingly embedded in the functional needs of those with the impairment. With this change of focus in intervention for HI, there is now a much clearer link and overlap between communication-based interventions for each type of impairment. These two communication-based therapies in tandem may provide important support for the growing number of individuals in whom these conditions occur together. Furthermore, research into the nature of the relationship between hearing loss and cognitive decline will have important implications for the potential use of hearing rehabilitation as a preventative measure for dementia.

The comorbidity of CI and HI and the impact it has on the independence with which older adults participate in everyday social life is becoming clearer. Efforts to recognize, assess, and respond to the needs of adults who have both CI and HI will become increasingly important for researchers and clinicians. However, the overall management of communication difficulties arising from the combination of CI and HI will need to rely on a deeper understanding of the association between the two impairments and the subsequent development of novel intervention programs specifically designed for this population. In the meantime, clinicians are encouraged to be cognizant of the potential overlap between CI and HI and to try to accommodate for each condition as best they can in their management.

DISCLOSURES

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