

## **Perspectives on Conducting Interdisciplinary Research in a Geriatric Audiology Clinic**

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### **Connections between Hearing Loss and Cognitive Impairment in a Geriatric Population**

Audiologists working with older clients must be aware of potential comorbidities which could influence treatment procedures and outcomes. These comorbidities may include vision loss, mobility restrictions, and issues with dexterity commonly associated with increased age, for example, osteoarthritis. In addition to these physical comorbidities, many older adults will also experience changes to their cognitive abilities, including attention and memory. Indeed, the incidence of cognitive loss is growing rapidly, with 7% of Canadians over the age of 60 and 49% of Canadians over the age of 90 diagnosed with dementia.<sup>1</sup> Milder levels of cognitive loss (e.g., Mild Cognitive Impairment; MCI) are found in even higher prevalence rates, ranging from 14–18% of community-dwelling individuals over the age of 70 years.<sup>2</sup> Researchers have studied the links between cognitive loss and hearing loss for over three decades. Early work by Weinstein and Amsel<sup>3</sup> showed higher prevalence rates of hearing loss in individuals with dementia compared to a sample of institutionalized, non-demented individuals. Similarly, the majority of clients in a geriatric memory clinic who were diagnosed with Alzheimer's disease were found to have failed a hearing screening.<sup>4</sup> Research by Uhlmann and colleagues has shown that hearing loss is more prevalent in individuals with dementia compared to control participants,<sup>5</sup> with greater cognitive decline over a period of one year in those participants with hearing loss.<sup>6</sup>

In recent years, larger-scale population-based epidemiological studies have provided even more compelling evidence of the strong link between hearing loss and cognitive loss, with rates of incident dementia increasing as the degree of hearing loss increases.<sup>7-9</sup> We have recently had the opportunity to study this connection in our own clinic at Baycrest Audiology. Upon investigating the cognitive status of a sample of our clients with clinically-significant hearing loss (82 in total, mean age of 84 years), only 20% had a passing score on a commonly-used cognitive screening test, the Montreal Cognitive Assessment (MoCA<sup>10</sup>; [www.mocatest.org](http://www.mocatest.org)). These results suggest that hearing health care professionals who work with older adults must be aware of the possibility of cognitive loss in their patients, and make adjustments accordingly.

Clients with cognitive loss are typically underserved by audiologists.<sup>11</sup> Unfortunately, very few studies exist to suggest that individuals with cognitive loss can benefit from audiologic rehabilitation techniques. Our own work has shown that the cognitive status of a client, at least as measured by a commonly used cognitive screening test, does not affect their ability to benefit from the use of hearing aid(s). It is important to share these data with other hearing health care professionals in order to advance the field and ensure that best practice for audiologists includes considering cognitive status and understanding how it can influence audiologic rehabilitation techniques. One way to do this is by engaging in research work with experts in the field of cognitive loss and aging. To that end, our geriatric audiology clinic in Toronto, Canada, has partnered with a group of psychologists to engage in groundbreaking interdisciplinary research.

Over the past three years, Baycrest Audiology staff members have worked together with an interdisciplinary team of psychologists on a series of research projects in the clinic. In particular, this team has been examining how the cognitive status of older clients influences service provision in the clinic, and determining new best practice procedures to use with older clients with cognitive loss. The team began their collaboration thanks to a small research grant from the Canadian Academy of Audiology, which supported the audiologists in developing a research project to examine whether information about a client's cognitive status could lead to modifications in the audiologist's treatment recommendations. Two psychologists mentored the Baycrest Audiologists throughout this project, which resulted in one publication submitted to a peer-reviewed journal and a series of well-received presentations, both at conferences and in the community. This work was conducted in parallel with a larger research programme that was designed to better understand how clients with varying levels of cognitive status can benefit from amplification.

## **Benefits and Challenges of Research Collaborations**

- The psychologists have provided education to the audiologists regarding the signs and symptoms of cognitive impairment. While the audiologists were already familiar with behaviours associated with cognitive impairment through their clinical contact with clients, and through educational opportunities at the specialized geriatric centre where they practice, they learned about specific tests that can be used to measure cognitive loss. Through the research association, the audiologists discovered that it can be difficult initially to recognise milder levels of cognitive impairment, and that this can have consequences for treatment decisions. For example, knowing about MCI and the early stages of cognitive decline has helped the audiologists to better understand changing behavior patterns of some clients who are experienced hearing aid users and appear to be coping well with certain aspects of everyday life, but are now suddenly forgetting basic aspects of device management (e.g., how to change their hearing aid batteries).
- In turn, the psychologists have learned more about the influence of hearing loss on cognitive function from the audiologists, and have further investigated potential effects of a client's hearing loss on assessment and intervention procedures. In particular, the clinical neuropsychologist who has worked most closely with the audiologists now feels more comfortable when discussing potential implications of this interaction between cognitive loss and hearing loss with clients and their family members/caregivers.
- Working with the researchers has been very beneficial for the audiologists in terms of expanding their skill set; for example, in learning how to create research ethics board applications and develop research protocols to ensure the minimization of variability in participant testing.
- Participating in research has encouraged consistency across the audiologists in terms of clinical protocol (e.g., how do they document when a measure of hearing aid satisfaction, the COSI, has been completed), and the specific tests that are included in the standard audiologic test battery.

The audiologists have worked together to conduct ongoing reviews and updating of their clinical protocols as well as to bring an aspect of “quality control” to existing clinical procedures.

- In addition to working with the psychologists on collaborative research projects, the audiologists’ expanded understanding of research methods has led them to develop their own research questions. For example, one new project in the clinic that the collaboration has led to is the development of educational videos. The audiologists provide clients with a thorough hearing aid orientation at the time of the hearing aid fitting; however, many clients return repeatedly for more instruction and counseling. Therefore, new instructional videos were designed to help our older clients master the proper use of their hearing aids. Four separate scripts were designed to address different styles of hearing aids, with step by step instructions on how to care for the devices (e.g., demonstration of landmarks on the hearing aid, information on maintenance and cleaning, insertion and removal in the ear, and replacing batteries). Three elderly patients from the department were asked to act in the videos. Early feedback from clients suggests that satisfaction with the videos is high and that clients are using them to enhance their adoption of their hearing instruments.
- Having a researcher available to consult with on clinician-driven projects (e.g., educational videos project) has increased the audiologists’ confidence in sharing their work with fellow professional outside the clinic, and they have improved pride in their work now that they can see the attention and prestige that the research collaborations are bringing to the clinic.
- From a professional perspective, participating in the research project allows the audiologists to add to the existing literature, through preparing and submitting manuscripts to peer-reviewed journals, and preparing poster and oral presentations for international conferences, such as the upcoming World Congress of Audiology. By becoming more aware of current research trends and findings, the audiologists’ practice is becoming more evidence-based. There is an increased focus on knowledge translation in everyday practice (e.g., counselling clients about the use of hearing aids and the strong connection between hearing loss and cognitive loss).
- In the future, the audiologists and psychologists plan to merge their knowledge to enhance and expand hearing rehabilitation for clients with memory loss, using techniques from existing Baycrest programs such as the ‘New Hearing Aid User’ classes to create new advances in education and counseling for clients with dual impairments.
- One of the biggest challenges of the research projects conducted in the audiology clinic has been that of recruiting participants. This may be due to their numerous other issues (e.g., medical, time constraints, transportation issues, caregivers who do not have the time for participating). The team has learned that recruitment criteria cannot be too strict or the research protocol too onerous as this will prevent older clients and their caregivers from participating. Clinical research with clients is very different from laboratory-based research, and the process of recruitment has been very educational for the psychologists as well.
- It can be challenging for busy clinicians to find the time to work on research projects, including preparing ethics proposals, manuscripts, and conference presentations. In order for clinical research projects to succeed, the entire team must commit fully to the integration of research into clinical activities. While the audiologists must be willing to contribute additional time and effort, there will inevitably be some impact on the everyday functioning of the clinic, and so it is important that the research is supported by all levels of management. If everyone understands the benefits of the research to clients as well as the clinic and health care facility, it is much easier to cope with unexpected challenges and the inevitable bumps in the road that will occur along the way!

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