Dual sensory loss in older Canadians: First insights from the Canadian Longitudinal Study of Aging

Anni Häimäläinen, Paul Mick, M. Kathleen Pichora-Fuller, Walter Wittich

With life expectancy steadily increasing and the baby boomer generation reaching retirement age, the number of senior citizens is on the rise. One consequence of this increase is that more people find themselves adjusting to newly acquired sensory challenges in their advanced years, as both vision and hearing tend to decline with age. As a result, acquired dual sensory loss is becoming an increasingly important public health concern and a research priority.

The consequences of combined vision and hearing impairments range from minor reductions in ability to perform everyday activities to major challenges participating in social activities, and even an increased risk of depression and dementia. People with mild visual or hearing loss can often compensate for an impairment in one sense by relying more on information acquired via the other sense. They may also need to harness more of their brain capacity to interpret the visual or auditory information that comes from the world to their brains. However, when both senses have deteriorated, or cognitive function declines simultaneously (e.g., due to dementia or mild cognitive impairment), the ability to compensate for sensory loss plummets. As a result, many studies have found that dual sensory loss (loss of both vision and hearing function) can have much more severe consequences for quality of life and independence than either hearing or vision alone and hearing impairment as average pure-tone air conduction threshold greater than 25 dB (500–4000 Hz, better ear).

For society to prepare to accommodate and care for older adults with dual sensory loss (and often many other co-occurring chronic health concerns), it is critical that we determine just how many people are at risk for or currently suffer from dual sensory loss, and whether there are modifiable lifestyle risk factors that could be addressed to prevent or slow the progression of dual sensory loss in older adults.

Epidemiologists can identify factors that could influence the risk of progression of dual sensory loss by collecting information on sensory function as well as details on various aspects of lifestyle and health in large numbers of people. Statistical methods are then used to determine which of those factors differ between people who have developed dual sensory loss and those who have not. We are examining dual sensory loss in 30,000 Canadians aged 45–85 years, who are participating in the comprehensive, ongoing Canadian Longitudinal Study of Aging (CLSA, https://www.clsa-elcv.ca/). This study is the largest undertaking in Canada to understand biological, psychological and social aspects of aging. The first wave of data collection was completed in year 2015, and the study is set to run for a total of 20 years. In addition to answering numerous questions about their background, lifestyle, environment and health, study participants complete a number of cognitive tasks and undergo vision and hearing testing. Our aim is to use data from the CLSA to examine longitudinal changes in hearing, vision, health, and many other aspects of aging.
as new waves of data become available. The result of this thorough examination will be a set of multidimensional snapshots of the participants’ lives taken every three years. With the same data collected over time for such a large number of people, patterns begin to emerge that link dual sensory loss with aspects of lifestyle and health.

Scaling up from the data set for the 30,000 people who are participating in the CLSA, we have estimated that there are currently upwards of 130,000 older people in Canada who have measurable dual sensory loss. We define dual sensory loss here as an unaided pure-tone average >25 dB HL in the better-hearing ear (for frequencies of 1000, 2000, 3000 and 4000 Hz), and pinhole-corrected visual acuity of logMAR >0.2 in the better-seeing eye (equivalent to visual acuity >20/32 (feet) or 6/10 (meters) for a Snellen fraction when measuring vision on a letter chart; i.e.

the person being tested can see at a distance of 20 feet or 6 meters what a normally sighted person can see at 32 feet, distance or 10 meters).

As predicted, we found that dual sensory loss was more common in older participants: a diagnosis of both hearing and vision loss increased from less than 1% in the 45–49 year-age group to 24% in the 80–85 year-group (Figure 1). However, when we asked participants to evaluate their own vision and hearing ability (from “excellent” to “poor”), only about 1% of the youngest age group (45–49 years old) and 3% of the oldest age group (80–85 years old) reported that their vision and hearing were “fair” or “poor”.

Thus, even though almost a quarter of this oldest age group were found to have dual sensory loss based on audiometry and visual acuity tests, fewer older people reported having sensory problems. This suggests that unless the impairments have noticeably severe consequences on people’s lives, most do not self-report dual sensory impairment that may be detected using tests of hearing and vision. This finding is important because other health problems may be worsened or complicated by sensory impairment even if the person does not notice a problem with their sensory function. For example, our preliminary results suggest worse cognitive function (executive function and short-term memory) in participants with dual sensory loss than in those with only hearing or vision loss or no sensory impairment. Strikingly, objectively measured sensory

FIGURE 1: Age-specific proportions of people with hearing, vision, and dual sensory loss in participants of the Canadian Longitudinal Study of Aging, based on audiometry and visual acuity measures.
loss (using audiometry and vision acuity tests) is a substantially better predictor of cognitive decline than self-reported sensory loss.

It is obvious from our results that sensory impairments and other chronic health issues are far from universal conditions in the older adults. Some women and men maintain excellent sensory function until old age. In examining factors other than age, we found that dual sensory loss was more common in men than women, in groups with a lower education and income level, and in people reporting lifestyle risk factors such as smoking, obesity, and unhealthy nutritional habits, as well as in those with diabetes or cardiovascular disease. The significance of these lifestyle risk factors suggests a possibility that age-related dual sensory impairment could be attenuated or even prevented with lifestyle adjustments. Encouraging people to adopt healthier habits also aligns with best practices for lowering the risk of heart disease, diabetes, and dementia among other aging-associated diseases. Thus, strategies that may reduce the risk of hearing and vision loss fit well in a more general approach to promote overall healthy aging.

Acknowledgments: This work was done in collaboration with the CCNA team 17, particularly Natalie Phillips (Department of Psychology, Concordia University) and Dawn Guthrie (Department of Kinesiology and Physical Education, Wilfred Laurier University). Funding was provided by a CIHR Catalyst grant & the Réseau Québécois de Recherche sur le Vieillissement (RQRV). Funding for CLSA is provided by CIHR (grant LS 9447) and the Canada Foundation for Innovation. The CLSA is led by Drs Parminder Raina, Christina Wolfson and Susan Kirkland. The preliminary findings reported here are based on analyses of the CLSA Baseline Comprehensive Dataset version 3.2.

For more information, contact anni.hamalainen@umontreal.ca

Authors: Anni Hämäläinen and Walter Wittich are affiliated with the School of Optometry, University of Montreal; Paul Mick is affiliated with the Faculty of Medicine, University of British Columbia and M. Kathleen Pichora-Fuller is affiliated with the Department of Psychology, University of Toronto.

References


“Thus, strategies that may reduce the risk of hearing and vision loss fit well in a more general approach to promote overall healthy aging.”

1 Walter Wittich is Leader of the DbI Research Network.