NATIONAL ADVISORY UNIT ON DEAFBLINDNESS

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Older people with combined visual and hearing loss

WHAT DOES THE RESEARCH SAY

SANDRA OCHOA, STATPED AND IRENE BONDAHL, SIGNO

Contents

Background information

We are facing a societal change where by 2030 there will be more elderly people than children in Norway (Statistics Norway, n.d.), the much-discussed demographic shift, also known as the 'age wave'. In an ageing population, an increasing number of people will have functional impairments that affect several senses and functions simultaneously. This can consequently lead to serious negative health effects.

Despite a relatively extensive research literature on sensory loss and ageing, the negative health effects associated with vision and hearing loss, individually or in combination, are underdiagnosed in older people.

The World Federation of Deafblind (WFDB. 2023:28) identifies four subgroups within the group of older persons with deafblindness:

1. Those who have acquired deafblindness from earlier in life
2. Those who are deaf and experience age-related vision loss
3. Those who are blind and experience age-related hearing loss
4. Those who are sighted and hearing until they begin to experience age-related vision and hearing loss late in life

The fourth subgroup, older people with deafblindness due to age-related vision and hearing loss, constitutes the largest group (WFDB, 2023:29). In contrast to the other three groups, this group is unfamiliar with alternative communication methods and compensatory strategies from earlier in life, and will thus have poorer prerequisites for maintaining good communication with their surroundings, gaining access to information and being able to move around safely and freely (ibid).

National advisory unit on Deafblindness (NKDB) provides advisory and guidance services to individuals with severe combined vision and hearing loss (defined as deafblindness) and their network, with the aim of building up competence that contributes to good conditions for activity and participation. Knowledge about the consequences of combined vision and hearing loss/deafblindness is limited, and the measures that can alleviate the situation are therefore little known. Competence building in municipal services and, specialist healthcare services, is therefore part of this work to ensure that the services are targeted and appropriate for individuals with combined vision and hearing loss/deafblindness.

NKDB's individual-oriented service provision is aimed at people with congenital or early acquired deafblindness (or where one of the sensory losses is congenital or early acquired). This means that the first three subgroups at WFDB are entitled to individual services from NKDB, while the fourth and largest group is excluded.

Our experience suggests that services for the elderly are fragmented and do not meet their needs. Hearing centers and ophthalmologists/opticians each focus on their own area of expertise, and technical aids have been developed for people with either vision or hearing loss. It is also not uncommon for primary care services to say that they do not prioritize sensory loss. This may be due to work pressure, but probably also an underestimation of

the challenges that can arise with impaired vision and hearing late in life.

According to the Nordic definition of deafblindness (2024), deafblindness is considered a separate disability, which affects the ability to communicate with the environment, obtain information and move around safely and freely. This will further limit opportunities for activity and participation. Simcock and Wittich (2019) describe how persons with deafblindness fall outside the UN's principles of participation and link this specifically to persons with deafblindness' need for assistance from another person to ensure communication, information and mobility. Ageing reinforces this need, and they further argue that the lack of interpreter-companions for older people with severe combined vision and hearing loss contributes to further exclusion of this group (Simcock, P. C., Wittich, W. 2019).

WHO (2019a) emphasizes that participation is crucial to our experience of quality of life, and quality of life has no age limit! For people with age-related vision and hearing impairments to be able to participate and experience what WHO (2015) calls healthy ageing (WHO 2015:28), society must be able to systemize and coordinate services to identify, prevent and implement necessary measures. Experience suggests that there are measures that can help improve or maintain the possibility for activity and participation.

Objectives

The purpose of this literature review has been to gather existing research on older people with a combined vision and hearing loss in order to highlight the challenges this group faces and how society meets them. With this as a starting point, we have developed the following problem statement:

What does the research literature say about:

1. *The challenges faced by seniors with combined vision and hearing loss?*
2. *How does the service meet these challenges?*

Method and structure

In this work, literature searches, sorting and reading of included literature has been done. Given the time constraints and resources available, it has not been possible to carry out a detailed critical appraisal of each study or discuss the strengths and weaknesses of the research in depth. The work is based on the abstracts of the research articles.

The purpose has been to gather relevant peer-reviewed research literature on elderly people with a combined vision and hearing loss, and then shed light on the challenges faced by this group and how the services meet these challenges.

In order to find relevant research literature, the working group has used the results from the literature review in the report 'Kunnskapsgrunnlaget på døvblindfeltet' (Svinndal et al., 2023, unpublished). In their work, a total of 15 literature searches were conducted, using the following databases: Embase, Eric, PsycNet, PubMed and Web of Science. Their first search was conducted in June 2022 and the last in April 2023.

The searches in our work were conducted in December 2023, using the reference tool Zotero. The searches consisted of the following keywords:

- Older persons, older adults, older individuals, older population
- Elderly, very elderly, retirement, 65+
- Long term care, home care, nursing homes

The search results yielded a total of 146 research articles published between 2013 and 2023. Based on the titles of the articles, these were sorted into three folders. The purpose was to separate articles that did not contain the following inclusion and exclusion criteria in the title or abstract:

Inclusion criteria	**Exclusion criteria**
Older people with a combined vision and hearing loss/deafblindness	Other causes of deafblindness such as congenital deafblindness and studies dealing with specific syndromes
*Older 60+	Consequences of the corona era
Challenges related to seniors with a combined vision and hearing loss	Specific technical aids
Different professionals who meet seniors with a combined vision and hearing loss	Vision or hearing loss in isolation
All research designs	

*With the exception of studies that dealt with close relatives. In these studies, people with combined vision and hearing loss are defined as 'older adults'.
* Three long-term studies are also included where the youngest participants were 55+ when the study started and 65+ when the results were registered (numbers 26, 72 and 93).

This sorting resulted in a total of 97 research articles. Ten categories were developed to further sort the articles. To streamline this process, Open AI was used with the following questions: 'What are the challenges experienced by older people who have a combined vision and hearing loss'. The suggestions were discussed in the working group. The abstracts of the 97 articles were read, and a detailed overview was prepared describing the content and findings. This contributed to increased knowledge of the nuances of the results and themes in the articles, and led to some names of categories being changed, and some new categories being developed. In the end, 70 articles were included in this work and are referred to in the results. An overview of the articles is included in the appendix.

The results

This chapter presents the results. The first part presents what the research says about the consequences of combined vision and hearing loss in the elderly in general. This is followed by a more in-depth look at the services provided.

Consequences of combined vision and hearing loss in the elderly

A combined vision and hearing loss affects many different aspects of life, which is confirmed by the articles we have looked at in this work. This is also consistent with what we as counselors experience in practice.

Several articles address what the Nordic definition of deafblindness describes as specific areas of difficulty: communication, information acquisition and freedom of movement. The articles confirm the challenges experienced by older people with a combined vision and hearing loss when it comes to communicating with their surroundings[12,45,54,61,68,71] , obtaining information[24,35] , and moving around safely and freely[13,17,20,61,78] . These challenges also have a direct impact on the individual's ability to be active and participate in society[8,15,29,30,40,42,45,50,52,54,61,80,86].

These challenges can lead to serious negative health effects. Among other things, several studies show that elderly people with a combined vision and hearing loss score worse on all health parameters compared to elderly people without sensory loss, or with only impaired vision or hearing. This includes greater levels of anxiety and depression[5,10,30,36,41,46,55,70,80,87,20] , cognitive challenges[5,11,12,14,22,26,30,44,45,47,56,66,80,97] , existential challenges[2,25,49,61] and increased mortality[46,66,89,93,96] . Older people with combined vision and hearing loss also have greater challenges with physical function[4,17,20] , and their safety is threatened by, among other things, difficulties registering alarms and the risk of falling .[28,72]

The digitization of society has brought with it new technology that has given people with a combined vision and hearing loss new opportunities in communication, information acquisition and free movement. At the same time, both research and experience show that it can be challenging to learn to use new technology and digital services as you get older, and that the challenges are amplified as your senses deteriorate[23,38,54,77] . This also applies to the ability to perform daily activities .[13,15,41,54,61,71,77,78,88]

Studies in which caregivers are participants[31,39,51] show that older people with combined vision and hearing loss and their caregivers experience challenges in their relationships and risk of social isolation. Perceived support from the system has a significant impact on maintaining healthy relationships and contributes to good mental health.

These secondary and tertiary consequences of living with a combined vision and hearing loss affect older people's quality of life .[4,48,52,60,71,86]

Older people with combined vision and hearing loss and their experiences with services

Eight studies[1,15,23,29,33,34,49,61] are highlighted that describe the experiences of older people with a combined vision and hearing loss when encountering services. Service providers referred to in these studies include rehabilitation services that focus on either vision or hearing loss (such as hearing centers or ophthalmology/optical centers), Medicare beneficiaries and long-term care. Some articles rely generally on good care experiences without mentioning specific service providers. Some of the services

that are mentioned are comparable to the services older people with a combined vision and hearing loss receive in Norway. The perspectives in these studies have a wide range. This reflects the heterogeneity of the group and the unique needs this group faces.

Several of the studies show that relationship building between the elderly and service providers is an important factor that affects the elderly's experience and motivation for the services provided. Lundin et al (2022)[1] conclude that good attitudes among professionals are an influencing factor.
For the participants, it was important to regain function and compensate for the loss of function, as well as meet others in similar situations. Although this study, like several[27,76,83,84] studies, mainly focuses on vision and hearing rehabilitation separately, this study shows that rehabilitation services contribute to older people's well-being and participation in general.

Being seen and treated like everyone else is fundamental to the experience of good care, and different sensory impairments can be a barrier to good communication, which in turn can reduce satisfaction with receiving services. For older people with a combined vision and hearing loss to experience good care services, service providers must facilitate good communication and have the ability to put themselves in their shoes and understand their experiences (Prause and Sorlie, 2018) .[49]

Assi et al. (2020)[33] show that older people with combined vision and hearing loss are more likely to report lower satisfaction with everything the study examined, including quality of care and access to health care and information, compared to older people without sensory loss. In some of the areas, such as access to information, lower levels of satisfaction were also reported by seniors with either vision or hearing loss only, compared to seniors with no reported sensory loss.

Among the many different consequences experienced by older people with combined vision and hearing loss, Jaiswal et al. 2020[29] put the spotlight on participation. The study shows that social support, availability of transportation services and use of assistive technology were the most important factors affecting participation.

The work of Lieve et al (2017)[61] identifies 122 challenges faced by older people with combined vision and hearing loss. The challenges show that older people face participation limitations such as lack of access to communication, information and mobility, and challenges in controlling what happens in their personal environment such as lack of control over their own physical possessions.

Urqeta Alfaro et al. 2021[23] and Alfaro et al. 2020[34] investigated whether older people with combined vision and hearing loss, who received rehabilitation services, had worse health-related outcomes than older people with only visual or hearing impairment who received rehabilitation services. In general, the study shows tendencies towards good health and a high degree of independence in all three groups. The results also show that a combined vision and hearing loss is not always associated with a worse health-related outcome than those who only have one sensory loss. For example, the combined group was more likely

to be independent in instrumental activities of daily living compared to those with only a hearing loss, and less likely to experience depressive symptoms than those with only vision loss. The researchers point out the need for further research, especially with regard to older people with more severe combined vision and hearing loss than those included in their sample, as well as the possibility of comparing with a sample not receiving rehabilitation services.

Findings in the study by Tomida et al.2022[15] show the likelihood of greater limitations in instrumental activities of daily living, as well as social and productive activities for older people with a combined vision and hearing loss compared to people who do not have a sensory loss over a two-year period. However, they did not find a significant difference when compared to people with only one sensory loss.

Professionals' experience of providing services and their need for expertise

Several studies describe professionals' experiences of providing services to older people with a combined vision and hearing loss. These five studies[6,25,43,57,75] identify various barriers that make it challenging to meet the needs of older people with combined vision and hearing loss. These barriers include perceived inadequacy, challenges in recognizing needs, and time, resources and expertise.

In a study by Prause et al. 2020[25] , existential care is explored from the perspective of clergy in encounters with older people with combined vision and hearing loss. Trust and confidentiality are considered important for embarking on these conversations. The priests say that their conversations are perceived as supportive, but at the same time they have an experience of inadequacy in the face of the elderly's existential challenges.

Wittorff et al (2023)[6] investigated care workers' attitudes, competence and awareness of combined vision and hearing loss in older people. Their findings show, among other things, inadequate identification and registration of elderly people with a combined vision and hearing loss, little awareness of the disability and inadequate information and training. It is also pointed out that care workers have little understanding of the prevalence of combined vision and hearing loss in an older population.

Fraser et al. 2019[43] report that healthcare professionals with varied professional backgrounds experience having several additional roles when working with older people with combined vision and hearing loss. These roles include being a counselor, navigator, guide and educator. This includes providing support with depression, acceptance, repeat consultations and navigating the healthcare system. By taking on these roles, the professionals experienced an increased workload, in addition to taking on tasks they are not trained for.

Wittich et al (2017)[57] and Wittich et al (2015)[75] have put the spotlight on occupational therapists as a professional group. The studies were conducted in Canada. In one study, they looked at the curricula of occupational therapists, which show minimal content with regard to the topic sensory loss. Vision-related topics were well covered, hearing-related topics were less so, and combined vision and hearing loss was largely absent. In the second study, respondents indicated that training on the topic of sensory loss was minimal and in

stark contrast to the proportion who reported meeting this user group.

Mapping and identifying combined vision and hearing loss in the elderly

Combined vision and hearing loss is poorly documented both in primary care and among audiologists and ophthalmologists, according to Dullard and Saunders (2016)[73] and Schneider et al. (2014)[83] . The results show that several assessment forms have been developed for use in vision or hearing clinics to detect whether the person has a combined vision and hearing loss[62,73,84,88] . According to Schneider et al (2014)[84] , this is important in order to, among other things, organize information, implement adapted measures and adapt technological solutions.

Roets-Merken et al. 2014[85] investigated the 'Severe Dual Sensory loss' screening tool. Their results show that nurses and nursing assistants who participated in the study reported that the tool was easy to use, and the study finds the tool valid and reliable.

According to Haanes et al 2014[88] , who investigated vision and hearing in home care patients in Norway, standardized measurements are needed to detect vision and hearing loss. In their study, there was little correspondence between objective measurements and self-assessments from the participants. The researchers concluded that asking specific questions about what they could hear or see is not sufficient to obtain indicators of participants' vision and hearing challenges.

Symptoms of combined sensory loss largely coincide with symptoms of dementia. In this regard, Bruhn and Dammeyer 2018[56] investigated a tactile test battery to see if it could be used to make a cognitive assessment in people with combined vision and hearing loss. The findings indicate that the symptoms of dementia can be distinguished from the symptoms of combined vision and hearing loss by using tactile tests.

Summary of the results

The results show a wide range of consequences experienced by older people with combined vision and hearing loss, and a wide range of needs.

Older people with a combined vision and hearing loss score worse on health parameters such as anxiety, depression and physical and cognitive function compared to older people without sensory loss, or with either vision or hearing loss separately. The specific challenges experienced by older adults with combined vision and hearing loss amplify the challenges associated with the ageing process, including moving around safely and freely, learning compensatory techniques and using assistive technology .[54]
The possibility of independence and participation for elderly people with a combined vision and hearing loss is largely about adapted communication and access to assistive technology, transportation services and companions, as well as learning new strategies and adapting and using technical solutions.

It is pointed out that care plans are often the service provider's key document for delivering services, and that these are not completed well enough for this user group[6]. Sensory loss and dementia pose a major challenge, and it is often dementia that receives attention and the focus of intervention .[6]

Good attitudes, relationship building and trust, being seen and understood are some factors that stand out in the research literature for the experience of good care for the elderly .[1,49,25,6]

The research literature highlights the importance of service providers identifying the needs of older people with a combined vision and hearing loss, addressing them and implementing measures to improve independence, quality of life and experience of good care[29, 61] . This presupposes that service providers have knowledge and expertise about combined vision and hearing loss and are able to facilitate good communication.

The research literature shows that service providers who encounter older people with a combined vision and hearing loss do not have the resources required to meet the diversity of needs.
Service providers express inadequacy, challenges in detecting needs, as well as time pressure, lack of resources and expertise[25, 6, 43, 57, 75] . This is also consistent with our experience.

Occupational therapists in Canada[75] report meeting many seniors with vision loss, hearing loss and combined sensory loss. Based on our experience, this is also the case in Norway. Occupational therapists' knowledge of the needs of older people with a combined vision and hearing loss can therefore be crucial in meeting a large part of their user group. Nevertheless, we see that the research literature points out that the topic of combined vision and hearing loss is often absent from the curricula for occupational therapy education[57, 75] , an education that aims to educate generalists. Based on these findings, the researchers discuss the extent to which sensory loss should actually be prioritized in their education. This can be seen in the light of the great breadth and range of needs experienced by older people with combined vision and hearing loss. It may be too much to ask of professionals who are already supposed to have extensive broad knowledge. Experience from our collaboration with occupational therapists also suggests that it is challenging for them to have sufficient knowledge and expertise to meet the needs of older people with combined vision and hearing loss. We therefore find it interesting to raise the discussion of whether it would be sufficient to strengthen their education, or whether other professional groups should have this role.

The research literature shows that the services provided are often divided into vision and hearing rehabilitation separately[27,76,83,84] . Several studies also show that mapping tools have been developed that can be used to detect combined vision and hearing loss in these rehabilitation services[62,73,84,88] , and which can therefore ensure adapted and appropriate measures. Nevertheless, the research literature and our experience indicate that such tools are not used

consistently neither in specialist health services nor in the municipal health service. As an example in Norway, the mapping form developed by Svingen and Lyng (2001) has not been used consistently. This is the same mapping tool translated and used in the study by Roets-Merken et al (2014)[85] where nurses and care assistants reported that it was easy to use.

Lundin et al (2022)[1] point out that the development of rehabilitation services adapted to older people with combined vision and hearing loss is necessary to meet the diversity of their needs. We also believe that there is a need to develop better adapted rehabilitation services, based on what the research literature tells us about the needs of older people with a combined vision and hearing loss, and how service providers seem to meet these needs.

Further work

This literature review highlights the complexity of the challenges faced by older people with combined vision and hearing loss. In our opinion, the challenges and needs identified require a systematic and coordinated service system with specialist expertise that can accommodate the heterogeneity of the group.

The findings of this work lay a foundation for further efforts, and emphasize the importance of prioritizing older people with combined vision and hearing loss in service development in different sectors and levels. NKDB can contribute to capacity building for municipal services and specialist health services in their efforts towards this group.

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Appendix 1

Table: Included studies
A total of 70 pcs.

Authors	Title	Number of participants	Methodology
(1) Lundin et al. 2022	Experiences of rehabilitation services from the perspetive of older adults with dual sensory loss - qualitative study.	20	Qualitative
(2) Prause et al. 2022	Balancing on a knife-edge Experiences of older patients with acquired deafblindness when receiving existential care	4	Qualitative
(4) Tseng et al. 2022	Physical function mediates the effects of sensory impairment on quality of life in older adults: Cross-sectional study using propensity-score weighting.	600	Quantitative
(5) Chen and Zhou et al. 2023	Association of sensory impairment with cognitive function and mental health among the older adults in China.	11722	Quantitative
(6) Wittorff et al.2023	Acquired Combined Vision and Hearing Loss: Awareness and Perceptions of Australian Aged Care Workers (Wittorff et al.2023)	24	Qualitative
(8) Tseng et al. 2022	Association between sensory impairments and restricted social participation in older adults: A cross-sectional study.	600	Quantitative
(10) Killeen et al.2022	Longitudinal Associations of Self-Reported Visual, Hearing, and Dual Sensory Difficulties with Symptoms of Depression Among Older Adults in the United States.	7593	Quantitative
(11) Hwang et al. 2022	Longitudinal Changes in Hearing and Visual Impairments and Risk of Dementia in Older Adults in the United States.	2927	Quantitative
(12) Guthrie et al. 2022	A Newly Identified Impairment in Both Vision and Hearing Increases the Risk of Deterioration in Both Communication and Cognitive Performance	106920	Quantitative

(13) Armstrong et al. 2022	Associations of dual sensory impairment with incident mobility and ADL difficulty.	2020	Quantitative
(14) Fuller-Thomson et al. 2022	The Association Between Hearing Impairment, Vision Impairment, Dual Sensory Impairment, and Serious Cognitive Impairment: Findings from a Population-Based Study of 5.4 million Older Adults.	5.4 mill.	Quantitative
(15) Tomida et al. 2022	Association of dual sensory impairment with changes in life space: A longitudinal study with two-year follow-up.	4214	Quantitative
(17) Shakarachi et al. 2021	The Association of Vision, Hearing, and Dual-Sensory Loss with Walking Speed and Incident Slow Walking: Longitudinal and Time to Event Analyses in the Health and Retirement Study	17648	Quantitative
(20) McKee et al.2021	Self-reported dual sensory impairment, dementia, and functional limitations in Medicare beneficiaries	7124	Quantitative
(22) Byeon et al. 2021	Dual sensory impairment and cognitive impairment in the Korean longitudinal elderly cohort.	6520	Quantitative
(23) Urqueta Alfaro et al. 2021	Older adults with dual sensory loss in rehabilitation show high functioning and may fare better than those with single sensory loss.	200	Quantitative
(24) Reed et al. 2020	Accompaniment to healthcare visits: the impact of sensory impairment.	12311	Quantitative
(25) Prause et al 2020	The Challenge of Being Present and Inclusive: Chaplains' Experiences With Providing Existential Care to Older Persons With Acquired Deafblindness.	5	Qualitative
(26) Mahariani et al. 2020	Associations Between Self-Reported Sensory Impairment and Risk of Cognitive Decline and Impairment in the Health and Retirement Study Cohort.	19618	Quantitative
(27) Lundin et al. 2020	Prevalence, diagnoses and rehabilitation services related to severe dual sensory loss (DSL) in older persons: a cross- sectional study based on medical records.	1257	Quantitative

(28) Lach et al. 2020	Fear of falling in sensory impaired nursing home residents.	225	Quantitative
(29) Jaiswal et al. 2020	Barriers and Facilitators That Influence Social Participation in Older Adults With Dual Sensory Impairment.	16	Qualitative
(30) Harithasan et al. 2020	The impact of sensory impairment on cognitive performance, quality of life, depression, and loneliness in older adults.	229	Quantitative
(31) Dunsmore et al. 2020	The Effort of Caring: The Caregivers' Perspective of Dual Sensory Impairment.	23	Qualitative
(33) Assi et al. 2020	Assessment of Sensory Impairment and Health Care Satisfaction Among Medicare Beneficiaries.	10783	Quantitative
(34) Alfaro et al. 2020	Older adults receiving rehabilitation for combined vision and hearing impairment report good levels of functional ability and well-being.	200	Quantitative
(35) Smith et al. 2019	A qualitative exploration of the experiences of community dwelling older adults with sensory impairment/s receiving polypharmacy on their pharmaceutical care journey.	23	Qualitative
(36) Simning et al. 2019	Depressive and Anxiety Symptoms in Older Adults With Auditory, Vision, and Dual Sensory Impairment.	7507	Quantitative
(38) Mueller-Schotte et al. 2019	Trajectories of Limitations in Instrumental Activities of Daily Living in Frail Older Adults With Vision, Hearing, or Dual Sensory Loss.	9319	Quantitative
(39) Hovaldt et al. 2019	Relational strain in close social relations among older adults with dual sensory loss.	302	Quantitative
(40) Heine et al. 2019	Older Women in Australia: Facing the Challenges of Dual Sensory Loss.	1000	Quantitative

(41) Heine et al. 2019	Dual Sensory Loss, Mental Health, and Wellbeing of Older Adults Living in China.	8268	Quantitative
(42) Heine et al. 2019	Sensory Loss in China: Prevalence, Use of Aids, and Impacts on Social Participation.	8268	Quantitative
(43) Fraser et al. 2019	Exploring Professionals' Experiences in the Rehabilitation of Older Clients with Dual-Sensory Impairment.	13	Qualitative
(44) Deardorff et al. 2019	Association of Sensory and Cognitive Impairment With Healthcare Utilization and Cost in Older Adults.	24009	Quantitative
(45) Davidson and Guthrie 2019	Older Adults With a Combination of Vision and Hearing Impairment Experience Higher Rates of Cognitive Impairment, Functional Dependence, and Worse Outcomes Across a Set of Quality Indicators.	352656	Quantitative
(46) Chang et al. 2019	The Co-Occurrence Of Frailty (Accumulation Of Functional Deficits) And Depressive Symptoms, And Its Effect On Mortality In Older Adults: A Longitudinal Study.	2498	Quantitative
(47) Whitson et al. 2018	American Geriatrics Society and National Institute on Aging Bench-to-Bedside Conference: Sensory Impairment and Cognitive Decline in Older Adults.	---	Professional discussion
(48) Tseng et al. 2018	Quality of life in older adults with sensory impairments: a systematic review.	---	Literature review
(49) Prause and Sorlie. 2018	Taking care of the existential needs: quality care for people with deafblindness.	3	Qualitative
(50) Mick et al. 2018	Associations between sensory loss and social networks, participation, support, and loneliness: Analysis of the Canadian Longitudinal Study on Aging.	21241	Quantitative
(51) Lehane et al. 2018	A relationship-focused investigation of spousal psychological adjustment to dual-sensory loss	45	Qualitative

(52) Jaiswal et al. 2018	Participation experiences of people with deafblindness or dual sensory loss: A scoping review of global deafblind literature.	---	Literature review
(54) Guthrie et al 2018	Combined impairments in vision, hearing and cognition are associated with greater levels of functional and communication difficulties than cognitive impairment alone: Analysis of interRAI data for home care and long-term care recipients in Ontario.	402402	Quantitative
(55) Cosh et al. 2018	The association amongst visual, hearing, and dual sensory loss with depression and anxiety over 6 years: The Tromsø Study.	2890	Quantitative
(56) Bruhn and Dammeyer 2018	Assessment of Dementia in Individuals with Dual Sensory Loss: Application of a Tactile Test Battery.	40	Qualitative
(57) Wittich et al 2017	Vision and hearing impairment and occupational therapy education: Needs and current practice.	15	Qualitative
(60) P. Simcock 2017	Ageing with a unique impairment: a systematically conducted review of older deafblind people's experiences.	---	Literature review
(61) Lieve et al. 2017	Problems identified by dual sensory impaired older adults in long-term care when using a self-management program: A qualitative study.	47	Qualitative
(62) McMahon et al 2017	Screening, Education, and Rehabilitation Services for Hearing Loss Provided to Clients with Low Vision: Measured and Perceived Value among Participants of the Vision-Hearing Project.	210	Quantitative
(66) Mitoku et al 2016	Vision and hearing impairments, cognitive impairment and mortality among long-term care recipients: a population-based cohort study	1754	Quantitative
(70) Guthrie et al. 2016	Self-Rated Health, Cognition, and Dual Sensory Impairment Are Important Predictors of Depression Among Home Care Clients in Ontario.	218850	Quantitative
(71) Guthrie et al. 2016	The Health and Well-Being of Older Adults with Dual Sensory Impairment (DSI) in Four Countries.	---	Prevalence of KAS in 4 countries (C, US, F, B)

(72) Gopinath et al. 2016	Hearing and vision impairment and the 5-year incidence of falls in older adults.	1478	Quantitative
(73) Dullard and Saunders 2016	Documentation of Dual Sensory Impairment in Electronic Medical Records.	20	Qualitative
(75) Wittich et al. 2015	Screening for sensory impairment in older adults: Training and practice of occupational therapists in Quebec.	102	Quantitative
(76) Vreeken et al. 2015	Effects of a Dual Sensory Loss Protocol on Hearing Aid Outcomes: A Randomized Controlled Trial.	128	Quantitative
(77) Lima et al. 2015	Correlates of dual sensory impairment in community-dwelling older people: An exploratory study.	1755	Quantitative
(78) Kwon et al. 2015	Sensory Impairment and Health-Related Quality of Life.	5260	Quantitative
(80) Yamada et al. 2014	Prevalence and Correlates of Hearing and Visual Impairments in European Nursing Homes: Results From the SHELTER Study.	4007	Quantitative
(83) Schneider et al. 2014	Dual Sensory Impairment and Hearing Aid Use Among Clients Attending Low-Vision Services in Australia: The Vision-Hearing Project.	300	Quantitative
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(85) Roets-Merken et al. 2014	Screening for hearing, visual and dual sensory impairment in older adults using behavioral cues: A validation study.	56 + 12	Quantitative
(86) Pinto et al. 2014	Sensory Function: Insights From Wave 2 of the National Social Life, Health, and Aging Project.	3005	Quantitative

(87) Heine and Browning 2014	Mental health and dual sensory loss in older adults: a systematic review.	---	Literature review
(88) Haanes et al. 2014	Sensory impairments in community health care: a descriptive study of hearing and vision among elderly Norwegians living at home.	93	Quantitative
(89) Fisher et al. 2014	Impairments in hearing and vision impact on mortality in older people: the AGES-Reykjavik Study.	4926	Quantitative
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(96) Tan et al. 2022	Associations of Hearing Loss and Dual Sensory Loss With Mortality. A Systematic Review, Meta-analysis, and Meta-regression of 26 Observational Studies With 1 213 756 Participants	213756	Literature study
(97) Tomida et al. 2022	Association of Dual Sensory Impairment with Cognitive Decline in Older Adults	4471	Quantitative