

Continuum of Care for Older Adults With Concurrent Hearing and Vision Impairment: A Systematic Review Protocol

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Abstract

Background: A recent global report estimates around 2% of the world population (~150 million people) to have concurrent hearing and vision difficulties (referred to as dual sensory impairment/DSI). Older adults with DSI often experience poorer levels of health and barriers to accessing health services in long-term care, home care and hospitals. Yet, the evidence is limited to inform the healthcare planning for this vulnerable population. Understanding the current state of the continuum of care for older adults with DSI is paramount to determine ways to promote healthy ageing. Hence, the objective of this systematic review is to summarize the information available on the continuum of care and synthesize evidence on existing and emergent strategies of screening, assessment and interventions to optimize care for older adults with DSI.

Methods: The review will be conducted in accordance with the Preferred Reporting Items for Systematic Reviews (PRISMA). Electronic research databases (CINAHL, Embase, MEDLINE, PsycINFO, Cochrane Library, Global Health and Web of Science), clinical trial registries (ISRCTN Registry, WHO ICTRP, and ClinicalTrials.gov) will be searched. Editorials, conference publications, thesis/dissertations, books or letters will be excluded. There is no date and language restriction applied, and databases are searched since inception.

Discussion: Healthcare professionals have little guidance on how to screen, assess, and provide best possible care to older adults with DSI while accommodating for their hearing and vision challenges; thus, the results of this review will be a relevant resource for policymakers, decision-makers, healthcare organizations, clinicians/professionals, and informal care providers of older adults with DSI. This review will document current practices, determine the evidence gaps, synthesize research findings, and make recommendations for future research priorities.

Systematic Review Registration: PROSPERO registration # [CRD42020180545](#)

Introduction

Age-related hearing impairment and vision impairment are projected to rank within the top ten burdens of disease in the middle- and high-income countries by 2030 (1). A recent global report estimates around 2% of the world population (~ 150 million people) to have concurrent hearing and vision difficulties (referred to as dual sensory impairment/DSI) (2). DSI is a condition that is more complex and disabling than hearing or vision impairment alone since vision and hearing are complimentary senses and enhance each other (3, 4). The interest of the scientific community in this population has increased recently due to emerging evidence suggesting a rise in the prevalence of this condition among older adults worldwide (5–10).

Considering the global age-related demographic shift, the world's population of older adults (65+) is likely to double by 2050 (11). With the prevalence of DSI among persons over the age of 65 years estimated around 21% (12, 13), 14 million older adults are expected to experience DSI by 2036 in North America (6, 14, 15). The rise in age-related DSI can be attributed to increased incidence of age-related sensorineural hearing loss, as well as cataracts, glaucoma, and macular degeneration among older adults (3, 4, 8, 16). This rise is of particular concern because age-related DSI may have the greatest impact on the health of older adults and may lead to poor health outcomes, such as functional and cognitive decline, social isolation, depression, poor self-rated health, and communication difficulties, which, in turn, are associated with an increased risk of high healthcare utilization and morbidity (8, 12, 24, 15, 17–23).

Evidence suggests that DSI in older adults is the strongest predictor of functional disability, and older adults with DSI experience decreased social participation with increased difficulty in functioning such as meal preparation, shopping, moving around and managing medications (8, 19, 25–32). Sensory loss among older adults has such serious consequences that the overall health of older adults with DSI is generally poorer than that of the general population (33, 34). Moreover, an individual with DSI is more likely to be affected by other medical conditions such as stroke, arthritis, heart disease and hypertension, thereby increasing the number of interactions they have with healthcare professionals and their use of the healthcare system (2, 33).

Older adults with DSI often have poor access to health care and may face more structural and psychological barriers to accessing health care services than their non-DSI peers (2, 8). From the limited research available to date, it is evident that

communication difficulties and undiagnosed associated cognitive impairment among those with DSI may lead to significant challenges in clinical assessment and care delivery (8, 22, 35, 36). Evidence from the United Kingdom and Nordic countries indicate challenges faced by older adults with DSI in accessing healthcare, such as making a medical appointment, reading prescriptions, to dependency on others to explain their concerns to the doctor due to inaccessible information, lack of awareness about DSI among staff, and limited communication support (37, 38). Often, information related to health is not available in accessible formats, such as braille or large print, that affect the ability of individuals with DSI to make health-related decisions (38, 39). Most healthcare professionals are not adequately trained to conduct assessments or design interventions for clients with DSI considering the unique needs of this population (8, 22, 40, 41).

Currently, the care for older adults with DSI is fragmented and often provided by separate hearing, vision care, and rehabilitation professionals who have no specific training to cater entirely to the health and psychosocial needs of older adults with DSI (4, 35, 40). These older adults access health services in long-term care, community care, home care, and hospitals, and yet, these organizations often do not have policies, programmes or protocols that provide guidance and training to the healthcare professionals to work with or simply to communicate with individuals with DSI (34, 40). Older adults with DSI feel anxious when accessing healthcare services, owing to fears that communication difficulties will result in their needs being misunderstood, and it becomes even more challenging in the absence of continuity of care when they have to see a different doctor each time they visit a hospital or clinic (37–39).

Overall, the evidence is limited to inform the healthcare planning for equitable access to healthcare of older adults with DSI. More research is needed to inform services/policies specific to meet the needs of the growing population of older adults with DSI. This priority is also reflected in the work of DSI researchers and the recent report by the World Federation of the Deafblind (2018) highlighting the challenges faced by people with DSI, and pinpointed to the risk of exclusion from the implementation of the United Nations Conventions on the Rights of Persons with Disabilities (UNCRPD) and the United Nations Sustainable Development Goals (2, 4, 32, 34–36, 42). Understanding the current state of the continuum of care for older adults with DSI is paramount to finding ways to promote healthy ageing.

To date, there are no comprehensive review focusing on healthcare access and interventions for older adults with DSI. We have conducted a preliminary search in PROSPERO, the Cochrane Database of Systematic Reviews, and the JBI Database of Systematic Reviews to avoid any duplication of the work and found no current or ongoing systematic reviews specifically related to healthcare access for older adults with DSI. Therefore, the objective of this systematic review is to explore the information available on the continuum of care and synthesize evidence on existing and emergent strategies of screening, assessment and interventions to provide optimal care to older adults with DSI. The systematic review aims to answer the following question: What are the tools and strategies of screening, assessment and intervention that were adapted and/or are available to provide equitable and optimal healthcare to older adults with concurrent hearing and vision impairment?

Methods

We used the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) statement to develop this protocol (43). (Additional file 1: PRISMA-P checklist). We will use the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) for reporting of the systematic review (44). A research protocol (registration ID-180545) has been registered in the International Prospective Register of Systematic Reviews (PROSPERO) and the study protocol registration number is: CRD42020180545.

We will conduct a systematic mixed study review because it entails the synthesis of data from studies with diverse designs, including qualitative, quantitative, and mixed methods studies (45, 46). By systematically assessing evidence from diverse designs, this review provides an up-to-date summary of the state of research knowledge on a healthcare topic.

Study eligibility criteria

Following the PICO (population/problem, intervention, comparison, and outcome) for this review, the *population* “older adults with DSI” is defined as an individual aged 65 years and over with a condition that combines varying degrees of both hearing

and visual impairment (47). The review will include studies on older adults with DSI from the following three distinct groups: Group 1 (older adults with pre-lingual deafblindness), Group 2 (older adults with post-lingual deafblindness—those who acquire both types of impairment during their lives or those with single sensory impairment [vision or hearing] by birth and then subsequently acquire another [vision or hearing] impairment), and Group 3 (older adults with dual sensory loss of vision and hearing due to age-related changes). The *intervention* is any strategy used by care providers that improves the experiences of access and utilization of healthcare by older adults with DSI in relation to meeting their healthcare or rehabilitation needs, including screening, assessment, and interventions. There are no *comparisons/controls*, while the *outcomes* are strategies and tools used by care providers that promote continuity of care for older adults with DSI. The focus is on equitable access to quality care that is seamless along the continuum of care from the screening of the DSI condition to receiving individual specialized health and rehabilitation interventions.

Consistent with the systematic review process, *post hoc* inclusion criteria are developed by the research team to assess the relevance of articles identified in the search process. Studies will be included if (1) they are original research studies of any study design, including randomized controlled trials, observational, descriptive, or cohort studies, case-control studies, cross-sectional studies, qualitative studies, and mixed methods studies, (2) all or some participants are older adults (age 65 years and above), and (3) participants had a concurrent hearing and vision impairment/DSI (defined subjectively through self-report or objectively using standardized screening or assessment tests for hearing and vision impairment). Studies were excluded if (1) they were prevalence or incidence studies, (2) they included only children (0-18 years) or working-age adults (18-64 years) with DSI, or (3) they are on sensory impairment in other senses, e.g., such as smell, gustatory, etc., or single sensory impairments (such as hearing or vision impairment only). Editorials, conference publications, thesis/dissertations, books or letters will not be included.

Information sources and search strategy

Database search strategies were developed by the research team in ongoing consultation with a senior health science librarian (PD) from the Université de Montréal. Dupont is one of the research team members and has over 25 years of experience in performing bibliographic and patent information searches, including systematic reviews over the last 10 years. A comprehensive literature search of eight databases (Cochrane Database of Systematic Reviews (from inception), CINAHL (1937-) via EBSCOhost, MEDLINE (1946-), EMBASE (1974-) via Ovid, Global Health (1973-), PsycINFO (1967-) via APA PsychNet, and Web of Science (1945-) will be performed in accordance with the Preferred Reporting Items for Systematic Reviews (44). To supplement our electronic search, we will search clinical trials registries such as www.ClinicalTrials.gov, BioMed Central ISRCTN registry (<https://www.isrctn.com/>), and International Clinical Trials Registry Platform (ICTRP) (<http://www.who.int/trialsearch/>). In addition, we will hand-search reference lists from selected studies to identify any additional studies not captured by our literature search. There will be no language and date restrictions. See Table 1 for an example of a search strategy used in Medline (as of June 26, 2020). The final search strategies adopted for all searched databases will be made available in the systematic review article.

Study Selection

Using PRISMA guidelines, a two-stage screening process will be used to assess the relevance of studies – first, at the level of title and abstract screening, second, at the level of full-text review. EndNote Versions X9 (Clarivate Analytics, PA, USA) will be used to manage references and remove duplicates, while screening of articles will be accomplished using Covidence (Veritas Health Innovation, Melbourne, Australia). Based on the following post-hoc inclusion criteria, the two reviewers (AJ & SG) will independently screen identified studies by titles/abstracts and classify them into three categories – ‘Yes,’ ‘Maybe’ and ‘No’ in Covidence. To ensure inter-rater reliability amongst reviewers, a pilot test of screening of 100 citations will be conducted prior to the screening of retrieved sources, and inter-rater reliability will be assessed. For articles in languages other than English, articles will be first translated using DeepL (a language translation software) and screened by (AJ & SG).

Following title and abstract screening, a full-text review of selected studies will be conducted independently by two reviewers (AJ & SG). The fourth reviewer (WW) (faculty member with expertise in DSI research and reviews) will be consulted to resolve

conflicts in the selection of articles at the title/abstract level screening as well as at the level of full-text review. Articles will be selected for full-text review if they focused on older adults with DSI and discussed strategies/tools that improves their healthcare access and utilization in some way. Studies that do not meet the criteria will be excluded, and reasons for their exclusion will be documented in Covidence using study tags. The reference lists from included studies will be hand-searched for additional articles for inclusion. Finally, search results will be summarized using a PRISMA flow diagram (<http://www.prisma-statement.org/PRISMAStatement/FlowDiagram>).

Risk of bias, assessment of methodological quality, and data extraction

Two reviewers (AJ & SG) will independently conduct the critical appraisal of the methodological quality of the included articles using the Mixed Methods Appraisal Tool (MMAT). The MMAT is designed for the appraisal stage of systematic mixed studies reviews, i.e., reviews that include qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies (48). This tool is chosen for this review as it is freely available, used in public health science and can accommodate studies of diverse designs. Each study will be assigned a quality score using MMAT.

Data extracted from each included study will comprise the following: author(s), year of study, location of study, stage of research, study design, study population, sample size, older adult definition/age range, sensory impairment definition, aim/focus of article, methods, interventions, key outcome/strategies, bias assessment and any other data significant to the systematic review research question. Any differences that arise in judgement will be resolved through discussion, or the consensus will be reached by discussion with the fourth reviewer (WW). Authors of some highly relevant studies may be contacted for additional information pertinent to the systematic review research and will be given two weeks to respond.

Data synthesis

Based on the study design (quantitative, qualitative, mixed methods), we will group and analyze the data separately, using statistical analysis for quantitative data and thematic analysis for qualitative data (49). We will use narrative (descriptive) synthesis as a primary strategy for data synthesis. Summary measures are reported, including odds ratios, linear regression coefficients, and correlation coefficients, and meta-analysis will be conducted, if the data allow. We will apply the PRISMA equity framework for critical reflection and interpretation of the cumulative evidence. We will report data in the form of tables of study characteristics, participants' details, outcomes, results, and authors' conclusions. While all team members will be involved in the process of interpretation and synthesis, the main reviewer (AJ) will produce the written review. We will provide recommendations taking account of all the qualitative and quantitative findings.

Knowledge translation

An integrated knowledge translation approach is used in collaboration with our partner organizations in Quebec and Ontario, Canada, to prioritize the research focus in this systematic review. We will engage in a consultation exercise with clinical and research experts in hearing, vision, and dual sensory impairment in Quebec and Ontario to discuss the findings of the review on emergent and existing strategies. To ensure dissemination of our review findings with partners and stakeholders, we will publish the review in a reputed health science journal. We will also design and share an infographic or research brief for older adults with DSI and their care providers. We will finally employ the communication materials of our community partners to share the findings.

Discussion

Healthy ageing is an important public health goal. In order to fulfil this goal and provide appropriate care for older adults with DSI, a strong evidence-base is essential for informed decision-making. Drawing from the review findings, the elements of recommendations will inform strategies to be integrated into the existing continuum of care within healthcare organizations to ensure better outcomes for older adults with DSI. The review will summarise the evidence on existing or emergent strategies to screen for hearing and vision impairment, diagnose the dual sensory impairment, and provide interventions meeting the healthcare needs of the older adults with DSI. Healthcare professionals have little guidance on how to screen, assess, and

provide best possible care to older adults with DSI accounting for their hearing and vision challenges. The results of this review will therefore be a relevant resource for policymakers, decision-makers, healthcare organizations, clinicians/professionals, and families of older adults with DSI. This review will document the practices used, determine the evidence gaps, disseminate research findings, and make recommendations for future research priorities. The outcomes of the review will inform the service delivery, and document best practices (tools and strategies) of screening, assessment and intervention adapted and/or available to provide equitable and optimal healthcare to older adults with concurrent hearing and vision impairment.

Abbreviations

DSI

Dual Sensory Impairment; MMAT: Mixed Methods Appraisal Tool; PRISMA: Preferred Reporting Items for Systematic reviews and Meta-Analyses; PRISMA-P: Preferred Reporting Items for Systematic Review and Meta-analysis Protocols; PROSPERO: International Prospective Register of Systematic Reviews; KT: knowledge translation

Declarations

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Availability of data and materials

All data generated or analyzed during this study will be available in another published article.

Authors' contributions

AJ and WW conceived and designed the study. AJ, SG, PD, and WW developed the protocol and registered the protocol with the PROSPERO database. AJ and SG drafted the manuscript, and PD and WW critically appraised and edited the manuscript. PD developed the search strategy in close collaboration with AJ and provided ongoing input in the review process. All authors read and approved the final protocol manuscript. AJ is the guarantor of the review.

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Tables

Table 1. MEDLINE search strategy (as of June 26, 2020)

#	Searches	Results
1	exp Deaf-Blind Disorders/	1064
2	((sensory or sensation) adj (impair* or loss* or disorder? or deficienc* or dysfunction? or defect?) adj10 (dual or double or multi or multiple)).tw.	266
3	(Sensation Disorders/ or (exp Hearing Disorders/ and exp Vision Disorders/)) and (dual or double or multi or multiple).tw.	893
4	((vision or visual) adj (impair* or loss* or disorder? or deficienc* or dysfunction? or defect?) adj10 (dual or double or multi or multiple)) and ((hearing or auditory) adj (impair* or loss* or disorder? or deficienc* or dysfunction? or defect?) adj10 (dual or double or multi or multiple)).tw.	37
5	(Deaf* and blindness* and (dual or double or multi or multiple)).tw.	113
6	(dual impairment? or dual dysfunction? or "hearing and vision loss*" or "Vision and Hearing Loss*" or deafblind* or deaf-blind* or Deafness Blindness or Blind-Deaf* or Deaf-Mutism-Blind or "hearing and visual impairment?" or "hearing and visually impaired" or "hearing and visual disability" or "hearing and visually disabled" or "vision and hearing impairment?" or "visually and hearing disabled" or "vision and hearing disability" or "vision and hearing dysfunction*" or "vision and hearing defect*").tw.	1002
7	((Usher or Hallgren or Wolfram) adj Syndrome?) or Dystrophia Retinae Pigmentosa-Dysostosis Syndrome? or Retinitis Pigmentosa Deafness Syndrome? or Deafness-Retinitis Pigmentosa Syndrome? or (Retinitis Pigmentosa and Congenital Deafness*).tw.	1556
8	1 or 2 or 3 or 4 or 5 or 6 or 7	3519
9	Health Services for the Aged/ or Geriatrics/ or geriatric assessment/ or Geriatric Psychiatry/ or Geriatric Nursing/ or Geriatric Dentistry/	84441
10	(geriatr* or psychogeriatr* or sociogeriatr* or Geronto* or Beers Criteria).tw.	54711
11	((elder* or aged) adj2 (care or caring or healthcare or (Health adj (Service? or centre? or center? or facilit* or institution?)) or hospital or clinic? or institutional#ed)).tw.	12473
12	9 or 10 or 11	123928
13	exp aged/ or Housing for the Elderly/ or Homes for the Aged/ or Senior Centers/ or Adult Day Care Centers/ or Healthy Aging/	3086423
14	(aged or old or older or elder* or frail or ageing or aging or senescence or "over 65" or "over 80" or "65 year*" or "85 year*" or Nonagenarian? or Octogenarian? or Centenarian? or ((retirement or senior?) adj (center? or centre? or home?))).tw.	2118438
15	13 or 14	4570944
16	insurance, health/ or insurance, health, reimbursement/ or insurance, hospitalization/ or insurance, long-term care/ or insurance, pharmaceutical services/ or insurance, vision/ or managed care programs/ or "health care (non-mesh)"/ or "health care facilities, manpower, and services"/ or capacity building/ or health communication/ or exp health facilities/ or health workforce/ or exp health personnel/ or health services/ or community health nursing/ or community pharmacy services/ or dental care/ or triage/ or health services, indigenous/ or home nursing/ or "hospice and palliative care nursing"/ or exp patient care/ or patient escort service/ or personal health services/ or pharmaceutical services/ or preventive health services/ or exp rehabilitation/ or health services administration/ or intersectoral collaboration/ or "organization and administration"/ or exp patient care management/ or "quality of health care"/ or "health care quality, access, and evaluation"/ or exp "delivery of health care"/ or Pharmaceutical Preparations/ or drugs, essential/ or drugs, generic/ or non-prescription drugs/ or prescription drugs/ or exp interprofessional relations/ or professional-patient relations/ or dentist-patient relations/ or duty to recontact/ or nurse-patient relations/ or physician-patient relations/ or therapeutic alliance/	3103743
17	(healthcare or ((health or medical or pharmacy or dental or patient) adj (service? or system? or management? or care)) or hospital visit? or (rehab* adj intervention?)).tw.	767644
18	(hospital* or ((health or rehabilitation) adj (facilit* or clinic? or centre? or center?)) or assess* or screen* or diagnos* or clinical or rehab* or therap* or health maintenance or Individual Practice Association? or Preferred Provider Organization? or Provider-Sponsored Organization?).tw.	9330563
19	((medical or pharmaceutical or drug) adj (practice? or treatment? or intervention? or approach*)).tw.	117371
20	(public health or (right? adj1 health) or ((government* or health) adj (equity or polic* or program? or	270808

	priorit* or plan* or resource?))).tw.	
21	((program? adj access*) or ((medical or insurance) adj (plan? or claim? or program? or reimburs*)) or ((health or medical) adj insurance?)).tw.	47443
22	(Practice Pattern? or Professional Practice? or Practice Gap? or Safety net? or Telemedicine or telehealth or Teleconsult* or Telepatholog* or teleradiolog* or Telerehab* or mhealth or ehealth or m-health or e-health or "Attitude of Health Personnel" or (care adj (planning or manag*)) or patient navigation or ((continuity or patient or community or institutional or residential or palliative or terminal or self) adj3 care)).tw.	212902
23	((tele or remote) adj (health or medicine or patholog* or radiolog* or practice? or consult* or rehab*)).tw.	1334
24	((Health adj (Personnel or staff or professional? or workforce?)) or physician? or nurs* or pharmacist? or dentist?).tw.	881624
25	(Target Population? or ((Professional or dentist or physician) adj Patient)).tw.	16794
26	(Interprofessional or Intraprofessional or interdisciplinary or intradisciplinary or Multidisciplinary or crossdisciplinary).tw.	120076
27	(Physician adj Nurse adj (professional or disciplinary)).tw.	1
28	((Intra or inter or multi or cross) adj (professional or disciplinary) adj (Relation? or communication?)).tw.	179
29	((Professional or doctor) adj Patient? adj (relation* or communication? or contact?)).tw.	4841
30	(Recontact* or Therapeutic Alliance? or (Duty adj1 (followup or follow-up))).tw.	2784
31	(Drug? or Pharmaceutical? or pharmacist? or pharmacy or pharmacies).tw.	1667816
32	16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31	12033451
33	(adolescent/ or middle aged/ or young adult/ or exp child/ or exp infant/) not (aged/ or "aged, 80 and over"/ or frail elderly/)	4619816
34	((8 and 12) or (8 and 15 and 32)) not 33	659

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