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# A scoping review of the pharmaceutical care needs of people with sensory loss

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## Keywords

hearing loss; patient safety; pharmaceutical services; scoping review; vision disorders

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## Abstract

**Objectives** This scoping review collated evidence of the pharmaceutical care needs of people with sensory loss (SL).

**Methods** Electronic databases were searched with no limit on year of publication: Medline (1946); Embase; Cinahl (1979); and Web of Science (1985). Search terms included the following: pharmacy; sight/hearing/dual impairment. Studies were included if they involved people with SL requiring pharmaceutical care and/or pharmacists/pharmacy support staff providing pharmaceutical care for people with SL. All study designs were eligible. This was a scoping review, and as such, the quality of studies was not formally evaluated.

**Key findings** Eleven studies were included. People with SL had lower levels of medication knowledge than their peers without SL. People with SL were identified as being at higher risk of iatrogenic harm than people without SL. Communication was a barrier to the provision of pharmaceutical care for people with hearing loss, with pharmacists relying on the provision of written information. The prevalence of SL increases with age, yet only two studies included older people. No studies involved family or carers of people with SL, people with dual loss or people with SL receiving polypharmacy.

**Conclusions** There is a paucity of data regarding the pharmaceutical care needs of people with SL. Unmet pharmaceutical care needs put people with SL at increased risk of harm from their medicines. A detailed understanding of the needs of people with SL is required which will inform future delivery of pharmaceutical care for this vulnerable population.

## Introduction

Sensory loss (SL) is typically used to describe loss of vision and/or hearing. Common causes of visual loss include the following: age-related macular degeneration, uncorrected refractive errors, cataract and glaucoma.<sup>[1,2]</sup> An estimated 285 million people live with visual loss worldwide; 39 million people are blind, 246 million people have low vision, and 82% of people who are blind are aged 50 and above.<sup>[1]</sup> More than one in 20 people worldwide have 'disabling hearing loss' defined as hearing loss >40 dB in the better hearing ear in adults and loss >30 dB in the better hearing ear in children.<sup>[3]</sup>

Hearing loss is caused by genetics, complications at birth, infectious diseases, ototoxic medication, exposure to excessive noise and ageing.<sup>[3]</sup> In the UK, 132 000 people live with dual SL and approximately 356 000 people live with hearing or visual loss.<sup>[4]</sup> By 2030, the number of people living with dual SL is projected to rise to 569 000<sup>[4]</sup> due to the ageing population; almost three-quarters of people living with severe dual SI are aged 70 and over.<sup>[4]</sup>

People with SL experience disparities in health and functioning. People with dual SL have higher mortality

rates compared with people without SL.<sup>[5]</sup> Older people with SL are more likely to have experienced a fall, to have broken a hip and are more likely to have had a stroke than individuals without SL.<sup>[6]</sup> Furthermore, older individuals with dual SL have higher levels of anxiety and depression<sup>[6]</sup> and lower levels of participation in social activities than participants without SL.<sup>[6]</sup> Individuals with hearing loss also have higher levels of depressive symptoms and lower levels of self-rated health than participants without hearing loss.<sup>[7]</sup>

Effective, accessible and timely pharmaceutical care is of importance for people with SL, particularly those who are older and receiving polypharmacy or complex medication regimens.<sup>[6]</sup> A study in the United States found that participants with sight loss were three times more likely to report difficulty managing their medicines than people without sight loss. People with hearing loss were 1.6 times more likely than older people without SL to report difficulty managing their medicines. Furthermore, people with dual SL were four times more likely to report difficulty managing their medicines than people without SL.<sup>[6]</sup> The 'My Voice' telephone interview survey of 'approximately' 1200 blind/partially sighted people (exact figure not specified) in the UK found that nine out of 10 registered blind or partially sighted respondents reported that it was difficult or impossible to read details on medicines packaging.<sup>[8]</sup> Despite facing these difficulties, the report identified that 15% of blind/partially sighted people were carers, 30% of whom collected or administered medicines for the person they cared for.

The purpose of this scoping review was to identify and synthesise the literature regarding the pharmaceutical care needs of people with SL.

## Methods

### Search strategy

The following electronic databases were searched: Ovid Medline; Ovid Embase; Ovid Amed; Ovid HMIC; Cochrane library; Ebsco Cinahl; Ebsco Psych Info; Web of Science; ProQuest Assia; ProQuest Public Health; ProQuest Social Services Abstracts; ProQuest Sociological Abstracts; DynaMed Plus; BMJ Best Practice; and Elsevier Clinical Key. Search terms included the following: pharmacy; sight impairment; hearing impairment; and dual impairment. No limits were set on year of publication; searches were conducted between November 2016 and September 2017. (A full search strategy for Medline is included in Figure S1.) Titles and abstracts were assessed for relevance, and full texts of relevant articles were retrieved. The reference lists of included texts were searched.

### Selection criteria

Publications were included if they contained empirical data (both quantitative and qualitative) which involved people with SL requiring pharmaceutical care and/or pharmacists/pharmacy support staff providing pharmaceutical care for people with SL. All evaluative study designs were included. Due to resource limitations, only studies published in the English language were included.

## Results

The number of articles identified from database search was as follows: Amed: 188; Cinahl: 42; Embase: 3095; HMIC: 57; Medline: 537; ProQuest: 13; PsycINFO: 72; and Web of Science: 89. After title, abstract and reference list searches, 11 studies were included, of which three were conducted in the UK,<sup>[9–11]</sup> two in each of United States<sup>[12,13]</sup> and Malaysia<sup>[14,15]</sup> and one was conducted in Canada,<sup>[16]</sup> Saudi Arabia,<sup>[17]</sup> Japan<sup>[18]</sup> and Thailand.<sup>[19]</sup> Three studies included people described as deaf/hard of hearing/hearing-impaired,<sup>[12,14,18]</sup> and four studies included participants with sight loss.<sup>[9,15,16,19]</sup> One study included participants with 'normal' vision who used goggles to simulate sight loss.<sup>[10]</sup> Two studies specifically sought to recruit participants over the age of 65.<sup>[9,16]</sup> None of the studies recruited participants with dual impairment, and one study of people with sight loss<sup>[15]</sup> excluded participants if they had 'uncorrectable' hearing loss. Two studies included community pharmacists.<sup>[11,13]</sup>

A range of research designs was used. One study used a case-control design<sup>[9]</sup> to explore medicines management in older people with sight loss compared with age-matched controls without sight loss. Five cross-sectional studies were included,<sup>[11,13,15,17,19]</sup> three of which utilised questionnaires that were administered face-to-face by researchers as the participants had sight loss.<sup>[15,17,19]</sup> One study used focus groups with deaf and hearing-impaired participants,<sup>[12]</sup> whilst another used a pre-/post design to test the effect of a 2-hour medical education lecture for deaf and hearing-impaired participants.<sup>[13]</sup> Two experimental studies compared the legibility of sample prescription medication labels from community pharmacies against the legibility of prototype labels, based on best practice guidelines.<sup>[10,16]</sup> Given the heterogeneity of the study designs, sample sizes varied (see Table S1 in Supporting information which shows a summary of included studies).

### Sight loss

Seven studies explored the pharmaceutical care needs of patients with sight loss. The most common challenges for

patients with sight loss in the study conducted in Saudi Arabia were identifying medicines (indicated by 75% of participants), recognising medicine dosages (82%) and identifying expiry dates (92%).<sup>[17]</sup> The study in Malaysia identified that reported ease of use varied by dosage form, with liquid preparations and ear/eye drops rated as the most difficult to use.<sup>[15]</sup> Furthermore, the case-control study in Northern Ireland found that 24% of older participants with sight loss had difficulties distinguishing between medicines compared with none of the age-matched controls.<sup>[9]</sup> Two studies from Thailand and Malaysia<sup>[15,19]</sup> reported that participants managed their medicines solely by memory to distinguish between medicines and dosages. The study from Malaysia also found that 75% of participants with sight loss did not know the expiry date of their medicines and 58% were unable to name their medication, whilst 72% of participants did not know how to store their medicines appropriately.<sup>[15]</sup> The study also found that 89% of participants reported that they were unable to read prescription labels completely.

A study comprising of two surveys of 200 community and hospital pharmacy staff in England examined staff awareness of the pharmaceutical care needs of people with sight loss and resources used in practice.<sup>[11]</sup> Pharmacy staff awareness of sight loss was poor; 98% and 91% of participants across the two surveys thought labelling medicines was 'extremely' or 'very' important; however, 55% of respondents in both surveys reported assuming that patients could read labels. The majority of pharmacy staff, 82% of respondents in the first survey and 67% in the second survey, indicated that no routine service was available for people with sight loss.<sup>[11]</sup>

Three studies identified the role that family members or carers played in facilitating the pharmaceutical care of people with SL.<sup>[9,17,19]</sup> One case-control study<sup>[9]</sup> found that more older people with sight loss relied on daily help to administer or organise their medicines than age-matched controls without sight loss. Over half (52%) of 95 participants in the study from Saudi Arabia received their medication instructions from friends or relatives, and 46% of participants relied on others to use their medicines.<sup>[17]</sup> Nearly half (46%) of these participants did not consider the service that they received from their pharmacist to be sufficient to enable them to use their medicines in the correct way.<sup>[17]</sup> Furthermore, whilst the majority (91%) of these participants used Braille, only 18% received Braille labels with their medicines.<sup>[17]</sup> The study of 86 participants with sight loss in Thailand reported that 97% of participants who received dispensed medicines also received an 'explanation of drug use', but the meaning of this statement was not clarified. Only 20% of participants received medicines package that patients could differentiate by touch.<sup>[19]</sup>

The two studies which adopted an experimental design, collected samples of pharmacy prescription medication labels and produced prototypes based on best practice guidelines to assess and compare the effect on the legibility of the labels.<sup>[10,16]</sup> The earlier study found that none of the labels met the UK Design for Patient Safety Guidelines<sup>[20]</sup> and that the median font size of directions for using medicines was 9.5 point (range 8–10) and not the recommended 12-point minimum font size.<sup>[10]</sup> The study involved participants with 'normal' vision who wore goggles to simulate mild/moderate sight loss; the prototype label increased accurate reading speed by 58% compared with the typical pharmacy label in the 'mild' sight loss category, whilst the large print label increased accurate reading speed by 100%. In the simulated 'moderate' sight loss condition, 65% of participants were able to read the directions to use the medication appropriately with the prototype label, increasing to 80% of participants with a large print prototype label compared with 20% of participants reading typical pharmacy labels. The authors suggested that following the UK Design for Patient Safety Guidelines increased legibility for participants with simulated sight loss and recommended that the study should be extended to participants with actual sight loss.<sup>[10]</sup>

The above study was then repeated in Canada<sup>[16]</sup> with three groups of participants: 24 older adults with 'normal' vision; 24 older adults with sight loss; and 24 younger adults with sight loss. No significant differences were detected in participants' reading speed and accuracy between sample pharmacy labels and prototype labels or between groups. However, prototype labels were read faster than sample pharmacy labels ( $p < 0.001$ ) and participants preferred labels in the largest print option ( $p < 0.001$ ) and instructions with numbers written in highlighted uppercase words ( $p < 0.001$ ).

## Hearing loss

Inadequate communication in the interaction between pharmacists and people with hearing loss was identified as a barrier to effective pharmaceutical care in four studies.<sup>[12,13,14,18]</sup> In a focus group study with 20 deaf/hearing-impaired participants in the United States, participants reported being unable to hear their name being called out in the pharmacy and many struggled with the complexity of written material given to them as a means of communicating information about their medicines.<sup>[12]</sup> Participants with hearing loss were unclear of the roles and responsibilities of different members of the pharmacy team and that their expectation of pharmacists was to dispense medications rather than provide information and support. Many participants reported that they

were happy with the pharmacy service they received, which they judged based on whether they received the medicines they needed. However, several participants reported that they felt pharmacy staff were rushed and impatient. Many participants stated that they wanted direct contact with the pharmacist and reported that the lack of continuity amongst pharmacy staff members on different visits made communication difficult.<sup>[12]</sup>

One study compared medication knowledge with participants who were deaf or had hearing loss with participants who had no hearing loss. Participants who were deaf had the lowest medication knowledge scores, and participants with hearing loss also had lower medication knowledge scores<sup>[18]</sup> In the same study, conducted in Malaysia, deaf participants overestimated their knowledge about their medicines.<sup>[18]</sup> The authors suggested that pharmacists may not be providing deaf people with explanations appropriate to their reading level.<sup>[18]</sup> One-third of the 20 focus group study participants who were deaf/hard of hearing in another study from Malaysia<sup>[14]</sup> had experienced an adverse reaction to their medicines as a result of not understanding how to use them. Many (40%) of the participants were unaware that patients can experience adverse effects if they do not understand instructions given by a pharmacist.<sup>[14]</sup>

In a survey of 73 community pharmacists working in an area with a large population of deaf people in the United States, 36% of respondents indicated that deaf patients received 'less than their best care' due to communication issues.<sup>[13]</sup> Whilst 93% of pharmacists reported previously interacting with a deaf patient, only 30% stated that they were somewhat/very comfortable interacting with deaf patients.<sup>[13]</sup> The provision of written information was the most commonly reported method of communicating with deaf patients followed by speaking so that the patient could lip read or use a family member to interpret information. The authors concluded that, whilst most pharmacists believed that the provision of written information was a sufficient method of communication, it might result in important information being omitted due to time pressures and it also does not ensure that the patient understands the information. Similarly, the study conducted in Japan, which involved a pharmacist-delivered 'medical education' lecture to patients, also suggested that pharmacists might not be providing deaf people with explanations appropriate to their reading level<sup>[18]</sup>; finding that 'medical education' tailored to the reading skills of deaf participants increased their knowledge of medicines. However, in the study with 15 participants in Malaysia, 80% of participants selected written communication as a means of accurately delivering messages; 66.7% selected sign language, and 20% selected pictures.<sup>[14]</sup>

Pharmacists in the United States reported using patients' family members to communicate with patients with hearing loss.<sup>[13]</sup>

### Sensory loss and pharmaceutical care

Several studies identified that people with SL were at risk of harm from their medicines.

Two studies found that people did not report their difficulties with medicines/SL to their pharmacist.<sup>[17,19]</sup>

A number of the studies made recommendations intended to improve pharmaceutical care for people with SL. One study reported participant recommendations for improved pharmaceutical care for people with SL.<sup>[12]</sup> Participants suggested communication between people with hearing loss and pharmacy staff could be improved by the following: larger writing on medicine labels; clearer warnings; pharmacy staff using simpler language; printing out information with pictures to highlight warnings and when to use medicines; and that pharmacy staff used lists instead of large paragraphs of information when written information is provided. The suggestion of larger font sizes on prescription labels was supported by the studies comparing the legibility of sample pharmacy labels and prototype labels based on best practice guidelines.<sup>[10,16]</sup> The first study recommended that labels should be a minimum of font size 12,<sup>[10]</sup> whilst the second<sup>[16]</sup> recommended a combination of larger print, consistent layout and left justification; overall, lowercase lettering with uppercase for numbers and instructions and highlighting in yellow, noting that improvements in legibility of prescription labels can be achieved without changing current technology or label size.

Another study<sup>[17]</sup> also noted that pharmacists can use rubber bands and tactile labels (dots or strips of tape) to help people with sight loss differentiate between medicine containers. Authors of the case-control study of older people with and without SL<sup>[9]</sup> highlighted the importance of pharmacists asking patients about their vision and ensuring that they have appropriate support to open packaging, distinguish between medicines packaging and use their medicines. This study listed examples of practical assistance included the following: the use of large print labels; containers of different shapes and textures; and electronic devices with prerecorded instructions.<sup>[9]</sup>

It is of note that people with hearing loss who participated in the focus group study<sup>[12]</sup> did not expect pharmacists to become competent in sign language; rather they wanted pharmacists to improve their knowledge of and attitudes towards people with hearing loss, along with improving their ability to interact with patients with hearing loss. The study authors concluded that pharmacists



need training to become more culturally sensitive to the deaf community and to become more competent in their interactions with deaf patients. This conclusion was supported by another study<sup>[14]</sup> which suggested that training pharmacists to be culturally competent is key to improving pharmaceutical services for people who are deaf or experience hearing loss. Finally, the authors of the survey of people with sight loss in Saudi Arabia recommended change on a larger scale, calling for governments, pharmaceutical companies and pharmacists to work together to meet the needs of people with sight loss.<sup>[17]</sup>

## Discussion

This review included 11 studies, which met the inclusion criteria, and highlighted a paucity of studies examining the pharmaceutical care needs of people with SL and the lack of evidence to inform practice. Overall, however, there are clear indications that people with SL have more problems managing their medicines than those without SL, and thus, their pharmaceutical care should be tailored to reflect this.

### Strengths and limitations of the research

This study is the first to review and synthesise the pharmaceutical care needs of people with SL. Implications for practice development, education and future research have been identified. Given that this was not a systematic review, the quality of the studies was not formally assessed. This is consistent with scoping reviews as these include a wide range of study designs.<sup>[21]</sup> It should be noted that the sample sizes of a number of studies were small. Studies were conducted in a variety of settings in various health-care systems. The extant literature also does not reflect the heterogeneous nature of SL. The pharmaceutical care needs of people with dual SL were not explored in any of the studies, and despite SL being most prevalent in older people,<sup>[1,3,4]</sup> only two studies specifically investigated the experiences of older people with SL. No study explored the pharmaceutical care needs of people with SL using polypharmacy. Only two studies explored the experiences of pharmacy personnel when managing the pharmaceutical care needs of people with SL.

## General discussion

The evidence suggests that people with SL are at increased risk of harm from their medicines as a direct result of their sensory impairment. People with sight loss encountered problems distinguishing and identifying medicines, reading medicines labels and administering medicine.<sup>[15,17,19]</sup> This is unsurprising; a study which

administered five tests relating to medicines management to 492 community and residential setting dwelling older people in Sweden found 9.4% of participants could not read instructions on a medicine label.<sup>[22]</sup> This figure is likely to be much higher in people with reported sight loss. Furthermore, a study examining factors associated with non-adherence to glaucoma medicines in 141 American veterans (mean age: 70.22) found that problems with reading medicine instructions were one of three most commonly reported difficulties.<sup>[23]</sup>

Communication was identified as a key barrier for both pharmacists providing, and people with hearing loss receiving, pharmaceutical care.<sup>[12,13,14,18]</sup> Pharmacists reported relying on written information or on formal/informal carers to communicate with people with SL. A number of studies cited concern at the reliance on written information as a means of communicating information about medicines; suggesting that this does not ensure that the patient has understood the information<sup>[13,18]</sup> and that people who are deaf may have lower comprehension and reading levels than people with no hearing loss.<sup>[18]</sup> Written information also may not meet the communication needs of people with dual SL.

Informal carers were identified as playing an important role in facilitating the care of people with SI.<sup>[9,17]</sup> Despite these findings, no studies of family members or formal/informal carers were identified in the literature searches for this review. It is important to understand the experiences of carers who facilitate or have an active role in medicines management for people with SI and to identify whether they require support. A study in the UK assessing the number and type of medicine-related problems, and the impact this had on the health of people caring for older people, was conducted.<sup>[24]</sup> Most (67%) informal carers reported problems with at least one medicine-related activity, and carers who reported a greater number of medicine-related problems were more likely to experience carer strain and poorer mental status.<sup>[24]</sup> Furthermore, a literature review of 10 studies investigating the perspective of informal carers facilitating medicines management in people with dementia found that, amongst other dementia-specific difficulties, carers reported that their role was made more challenging by complex medicines regimens, healthcare system practices and a lack of information and/or training in medicines management.<sup>[25]</sup>

## Improving practice

From the limited evidence available, it appears that pharmacy personnel and other providers of pharmaceutical care do not have the appropriate knowledge and skills to deliver safe and effective care to people with SL. Future

research should seek to develop evidence-based training to inform the pharmaceutical care of people with SL, incorporating knowledge and understanding of the unique issues people with SL face in relation to medicines management. It follows that incorporating the pharmaceutical care needs of people with SI in undergraduate and post-graduate pharmacy curricula is a potential means of improving pharmaceutical care for this population. Furthermore, it follows that all health professionals involved in providing medicine-related care would benefit from evidence-based training to inform their care of people with SL.

## Future research

Given the association between ageing and increased incidence of SI,<sup>[1–4]</sup> future research is required to explore the pharmaceutical care needs of older people with SL in more detail. The current review identified only two studies which sought to recruit participants over the age of 65, one of which focussed specifically on the needs of older people with SL. This is particularly important, as rates of polypharmacy use also increase with age; older people comprised 23% of the population in England in 2014, accounting for 60% of NHS prescriptions dispensed.<sup>[26]</sup> Three-quarters of individuals  $\geq 75$  years use prescribed medicines, and around 36% of older people use  $\geq 4$  different medicines on a regular basis.<sup>[26]</sup>

Future research should consider the role formal/informal carers have in facilitating medicine management and pharmaceutical care of people with SL. This review identified that pharmacists used carers to facilitate communication with patients with SL; however, no studies exploring the role of carers in pharmaceutical care of people with SL were identified. Finally, whilst a number of studies made suggestions for pharmacists to facilitate the pharmaceutical care of people with SI, however, only one study asked participants with SL to suggest improvements they would make to pharmaceutical care. Only two studies explored the perspective of pharmacists providing pharmaceutical care to people with SL. As our review has highlighted, the literature focused on the intersection of pharmaceutical care and SL is scarce. We did not identify any intervention studies that sought to enhance pharmaceutical care for people with SL. Future research may specifically focus on strengthening the communicative competencies of pharmacy personnel in relation to people with SL. Further, we currently do not know whether identified safety risks lead to preventable medical complications, hospitalisations and mortality amongst people with SL. Monitoring pharmaceutical care-related health outcomes for this population is of critical importance.

## Conclusions

Despite the growing prevalence of sensory impairment globally, there is a paucity of information regarding the pharmaceutical care needs of people with sight, hearing and dual SL.

This review presents a novel synthesis of existing evidence and highlights that people with SL have additional pharmaceutical care needs (which vary according to the nature of their impairment) that these needs are not always met and that this patient population is at increased risk of harm from their medication as a result.

A detailed understanding of the needs of people with SL is required which will inform future delivery of pharmaceutical care for this vulnerable population.

## Declarations

### Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

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## Authors' contributions

KK wrote the scoping review protocol, reviewed papers and decided which papers should be included in the review, extracted and synthesised data from the papers and wrote the manuscript. LM advised on drafts of the review protocol and commented/made revisions to the manuscript. AS advised on drafts of the review protocol and commented/made revisions to the manuscript. TK advised on drafts of the review protocol and commented/made revisions to the manuscript. KS advised on drafts of the review protocol and commented/made revisions to the manuscript. MCW advised on drafts of the review protocol and commented/made substantial revisions to the manuscript.

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## Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Figure S1.** Full search strategy of Medline.

**Table S1.** The findings of the studies included in the scoping review.