

QUALITATIVE PAPER

A qualitative exploration of the experiences of community dwelling older adults with sensory impairment/s receiving polypharmacy on their pharmaceutical care journey

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Abstract

Background: Most developed countries have increasing numbers of community dwelling older people with both multi-morbidity and sensory impairment that includes visual, hearing or dual impairment. Older people with sensory impairment are more likely to have chronic health conditions and to be in receipt of polypharmacy (>4 medicines). It is important to understand their experience of pharmaceutical care provision to facilitate a safe, appropriate and person centred approach.

Aim: this study explored the pharmaceutical care experiences and perspectives of older people with sensory impairment receiving polypharmacy.

Design and setting: exploratory qualitative study with semi-structured telephone or face-to-face interviews with community dwelling older adults with sensory impairment receiving polypharmacy in Scotland in 2016.

Methods: in total, 23 interviews were conducted with older people from seven of the 14 Scottish Health Board areas.

Subjects: over half the participants ($n = 12$) had dual sensory impairment, six had visual impairment and five had hearing impairment.

Results: three overarching themes were identified reflecting different stages of participants' pharmaceutical care journey: ordering and collection of prescriptions; medicine storage; and administration. At each stage of their journey, participants identified barriers and facilitators associated with their pharmaceutical care.

Conclusions: this is the first comprehensive, in-depth exploration of the pharmaceutical care journey needs of older people with sensory impairment. As the number of community dwelling older people with sensory impairment and polypharmacy increases there is a requirement to identify challenges experienced by this population and offer solutions for safe and effective pharmaceutical care provision.

Keywords

older people, visual impairment, hearing impairment, pharmaceutical care, polypharmacy, qualitative

Key points

- Older people with sensory impairment receiving polypharmacy are at increased risk of experiencing adverse drug events.
- This population face challenges along their pharmaceutical care journey including ordering, storing and administering medicines.
- A system-wide approach is needed to provide continuous and safe integrated pharmaceutical care to this population.

Background

Globally, more people are living longer with multimorbidity [1] requiring complex treatment regimens and coordinated pharmaceutical care [2]. In Scotland, projections show a 25% increase in people >75 years with complex health and social care needs [3]. Impairments in vision, hearing, mobility and cognition become more prevalent with increasing age [4]. Sensory impairment (SI) in older adults include visual, hearing or dual impairments with significant impact on both function and quality of life [5, 6]. Visual Impairment (VI) is associated with falls, cognitive function, depression and mortality [5]. Impairment of either vision or hearing poses challenges for people to communicate and navigate their physical and social environments. The prevalence of Dual Sensory Impairment (DSI) requires more comprehensive environmental adaptations and assistance than required for hearing or visual impairment alone [7]. Older people with VI/HI/DSI are all more likely to report higher rates of comorbid conditions than older people without SI [6].

These complexities pose particular challenges in the provision of effective, accessible and timely pharmaceutical care, especially when it involves polypharmacy or complex medication regimens [6]. Polypharmacy is the prescribing of multiple items to one individual [8] and is often categorised as using four or more medicines [9]. Polypharmacy is not limited to prescription drugs and oral medications but also includes injections, suppositories, and creams along with over-the-counter medication and alternative therapies.

Pharmaceutical care is a philosophy of practice where the patient is the primary beneficiary of the pharmacist's or pharmacy personnel's actions. Pharmaceutical care focuses on the provision of drug therapy with the goal of achieving therapeutic outcomes for patients' health and quality of life [10].

In Scotland, 89% of older adults take one or more prescribed medications [11]. Problematic polypharmacy arises as a result of adverse drug interactions, inappropriate monitoring and patient non-adherence. Multimorbidity and polypharmacy increase the risk of Adverse Drug Events (ADEs), with reported prevalence of adverse drug reactions in community dwelling older people being as high as 78% [12]. One in five older adults >65 years are at risk of inappropriate and potentially harmful prescription medication use [13]. It is estimated that ADEs annually cause nearly 100,000 emergency hospitalisations of adults > 65 years in the USA [14]. Errors can occur at different stages of medication use when weak medication management systems and/or human factors such as fatigue and poor

environmental conditions affect prescribing, transcribing, dispensing, administration and monitoring practices [15]. These factors may be magnified for people with SI. In one study, compared to peers without VI, older people with VI were more likely to need help with their prescribed medication, had difficulty reading information, distinguishing between medications and opening packaging [16]. In another study, participants with HI had the lowest medication knowledge scores compared to those without HI [17].

Challenges reported by patients with VI include, difficulties identifying medicines, recognising dosages and identifying expiry dates [18], reading labels and lack of awareness of appropriate storage requirements [19]. A study on the pharmaceutical care needs of older people with SI, found that both patients and pharmacy personnel identified a wide range of factors that influenced access and provision of pharmaceutical care across all stages of the pharmaceutical care journey i.e. from the ordering or supply of medicines to their storage and administration [20]. While there is a growing body of literature that focuses on medicines management of older people generally, a recent scoping review revealed a paucity of research in relation to older people with SI [21]. There is recognition that person-centred pharmaceutical care may be successful in ensuring that older people are receiving the right medicines [2, 22]; yet we identified no studies that explored the perspectives of older people with SI receiving polypharmacy and their experiences with community-based pharmaceutical care.

The data presented here are part of a wider programme of work that explored pharmaceutical care of older people with SI receiving polypharmacy in Scotland. Findings from other elements of the study are reported elsewhere [20, 23]. The aim of the study reported here was to explore specifically the experiences and perspectives of older adults with SI on their pharmaceutical care journey.

Method

This exploratory qualitative study included semi-structured telephone or face-to-face interviews (depending on participant's preference) undertaken with community dwelling older adults with SI receiving polypharmacy (hereafter referred to as older people) in Scotland in 2016.

Sampling and recruitment

Older people were identified using purposive sampling [24] to reflect gender, age, geographic location, living alone or

with others, and those managing their medicines on their own or with caregiver assistance. Eligibility for participation were individuals aged >65 who had a SI (visual, hearing or dual impairment), regularly used ≥ 4 medicines and were community-dwelling in Scotland. Participants were mostly recruited through emails sent from relevant organisations (Forth Valley Sensory Centre, Perth Macular Society, Action on Hearing Loss and North East Sensory Services) and a newsletter advertisement by Sight Action (a Scottish charity supporting people with VI). Interested participants either contacted the researcher or gave consent for the researcher to contact them. A member of the research team (KK) was also invited to explain the study to service users attending a hearing aid clinic through which some participants were recruited.

A study information pack compliant with accessibility requirements for people with low vision [25] was forwarded to all participants who expressed an interest and participants were required to provide consent. Access to British Sign Language (BSL) interpreters for people with HI was anticipated, but was not requested by any research participant.

Ethics and accessibility and recruitment procedure approval

Ethical review and approval were received from the University of Dundee Research Ethics Committee (January 2016: Ethics Review reference number 15187).

Data collection

A semi-structured interview guide (Box 1) developed for the interviews was peer reviewed by the Project Advisory Group that comprised of individuals with SI, representatives from sensory disability organisations and the research team. Interviews sought to explore how older people managed their medicines including barriers and facilitators in the pharmaceutical care journey, especially in relation to obtaining medicines, managing complex medicine regimens, and perceived safety risks. Two pilot interviews were conducted (one each with a person with HI and a person with VI) and no further changes were required in relation to interview guide content or mode of administration. Participants self-disclosed their sensory impairment, health status and their medicine regime at interview. All interviews were conducted by KK until data saturation [26] was deemed to have been reached i.e. no new information relating to the topics of interest were obtained.

Data management and analysis

Interviews were digitally recorded, transcribed verbatim and converted to anonymous word files. Transcripts were content coded and analysed thematically using a coding framework that was developed inductively from the data and followed guidelines for qualitative thematic analysis [27]. Two researchers [NA, AT] independently coded five interviews to assess consistency with coding. Variations in

Box 1: Semi structured interview guide

1. Tell me about your sensory impairment. How does it affect you?
2. Tell me about how you manage your medicines.
3. Do you have any difficulties or problems managing your medicines?
4. [If relevant] What support, if any, would you like to help you manage your medicines?
5. How do you obtain your medicines?
6. What, if anything, do you use a community pharmacy for?
7. Talk me through a recent time that you have used* a community pharmacy.
8. Are you aware of how your community pharmacists could help you manage your medicines?
9. What role, if any, does your community pharmacist/community pharmacy play in helping you manage your medicines?
10. What support, if any, would like to receive from your pharmacist to help you manage your medicines?
11. Is there anything that your pharmacist/community pharmacy does that makes it easier or harder for you to manage your medicines?
12. How often do you use a community pharmacy? Do you use the same one?
13. Is your community pharmacy aware of your sensory impairment [If yes – how did this happen? If no, why is that?]
14. What, if anything, makes it difficult for you to use a community pharmacy?
15. What, if anything, helps you to use a community pharmacy?
16. Is there anything else relating to the topics that we have covered today that you would like to tell me?

coding were reviewed and agreed [27] and the coding framework was further refined and finalised by NA, AT, MW, LM and AS. All interviews were then coded based on this framework [NA] and verified by AT. Data were managed using NVivo (version 10).

Results

In total, 23 interviews were conducted with older people recruited from seven Scottish Health Board areas. Twelve participants had dual SI, 6 had VI and 5 had HI. Participant characteristics are detailed in Table 1. Interviews lasted on average for 28 ± 11 minutes.

Three overarching themes were identified that reflected different stages of participants' pharmaceutical care journey, including facilitators and barriers for ordering and collection of prescriptions; medicine storage; and administration (Figure 1).

Table 1. Participants' characteristics

Participant number	Age (years)	Sensory impairment (SI)	Living arrangement	Number of sensory aids used	Number of co-morbidities	Number of medicines/day
1	75	Dual	Lives with family	4	5	5
2	86	Dual	Lives alone	3	9	11
3	89	Visual	Lives alone	2	4	7
4	68	Visual	Lives with spouse	2	6	11
5	75	Dual	Lives alone	4	4	6
6	78	Dual	Lives with spouse	3	6	9
7	76	Visual	Lives with spouse	1	3	6
8	89	Visual	Lives alone	3	3	5
9	86	Dual	Lives with spouse	2	3	7
10	88	Dual	Lives alone	4	4	14
11	76	Dual	Lives with spouse	2	4	4
12	70	Visual	Lives alone	2	1	6
13	78	Hearing	Lives with spouse	2	6	11
14	87	Hearing	Lives alone	1	9	11
15	74	Hearing	Lives with spouse	2	5	14
16	89	Dual	Lives alone	1	7	5
17	91	Dual	Lives alone	2	5	9
18	95	Dual	Lives alone	2	5	4
19	80	Dual	Lives alone	2	3	4
20	83	Visual	Lives alone	1	3	5
21	81	Hearing	Lives with spouse	1	4	8
22	73	Dual	Lives alone	2	2	20
23	67	Hearing	Lives alone	1	5	8

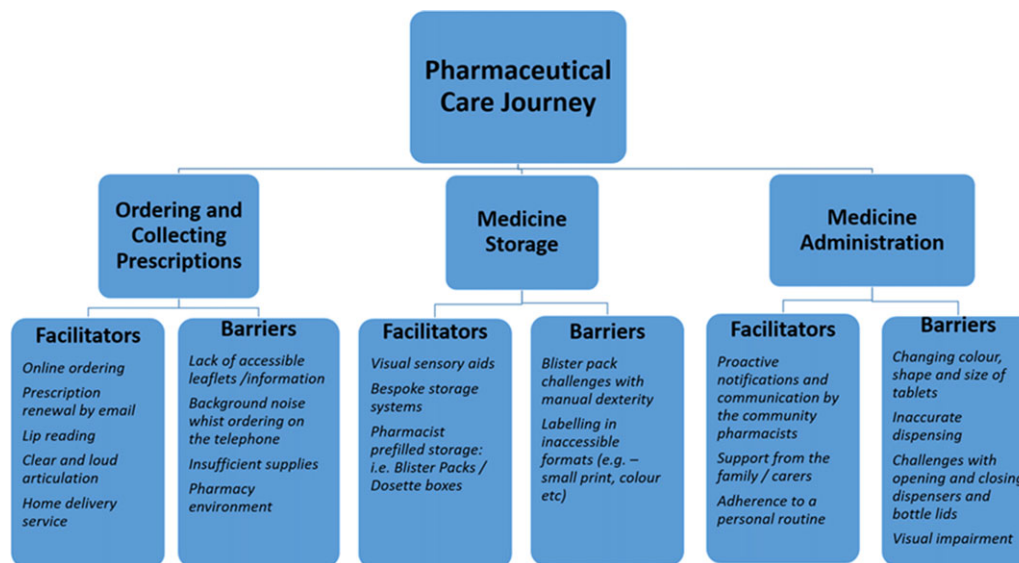


Figure 1. Stages of the pharmaceutical care journey of older people with sensory impairment.

Ordering and collecting prescriptions

Stage one of the pharmaceutical care journey describes participants' experiences with ordering and collecting their prescriptions from community pharmacies. The majority of participants regularly re-ordered their own prescriptions, usually contacting their General Practitioner (GP) and collected their prescription from the community pharmacist. Most participants telephoned for their repeat prescriptions, with some people using accessible technology, for example, large display screens or voice recognition.

'And now that you can order everything online which is very handy...I just go into patient access and it tells me when I last ordered it and all the information is on it which is very good... I mean I've got a 32 inch screen I use for my computer.' Participant 5, DSI

'I send an email to the [surgery]...and tell them what I want because I have got this wonderful thing on the computer that allows me to speak to it; I don't need to type.' Participant 8, VI

Some participants ordered their prescriptions online with family member support.

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My daughter, just two nights ago, had got me logged onto the internet method of trying to access repeat prescriptions.' Participant 1, DSI

The processes for ordering medicines were inconsistent; one participant described the lack of support with information to reorder their prescriptions.

'They don't have any sort of leaflet which I could have brought home and got my husband to read or I could have put it on the CCTV [type of magnifier] or I would probably have managed with a magnifier. So I was told nothing about how to reorder.' Participant 7, VI

Participants with a HI reported communication difficulties with ordering their prescriptions over the telephone.

'It is difficult on the phone, you think you hear, they tell you to put it [hearing aid] behind your ear but there is this terrible noise that people hear at the other end.' Participant 11, DSI

Participants with HI reported that they did not always hear complete medicine instructions and instead predicted what had been said. This barrier was amplified when conversations were conducted on the telephone. Having face-to-face direct conversation, speaking slowly and clearly helped with the quality of communication. Some participants with hearing aids also used lip reading techniques to aid comprehension; however, not all HI participants were adept at lip reading.

'The brain has processed what she said, even if you hadn't heard all of it...You know what they're going to ask, even if you didn't hear it particularly well.' Participant 15, HI

Participants collected their medicines from the community pharmacy either in person, with the assistance of a friend or family member or the prescription was delivered to their home by a delivery driver. Some people with VI reported that the layout of pharmacies with narrow aisles could be difficult to navigate and recounted bumping into shelves and other customers. Others reported more confidence in negotiating the pharmacy environment particularly when the pharmacy counter was situated near the entrance. Familiarity with the layout was advantageous and this was also helpful for participants with guide dogs.

'My guide dog and I would just walk along up to the pharmacy and [dog's name] would recognise where the door is and I know approximately when I'm walking with him where the pharmacy is.' Participant 4, SI

The home delivery service was described as helpful despite the fact that there was no direct contact with their pharmacist to discuss any problems. Participants who used the home delivery service were overwhelmingly positive, describing it as 'very good', 'excellent' and 'tremendous' and one participant changed their pharmaceutical care provision to a pharmacy that provided a delivery service.

'Well I think the biggest help is getting them delivered. I used to have to get somebody to go but then [pharmacy name] deliver them so he comes every week with them.' Participant 10, DSI.

The home delivery service was not without its own challenges. Participants reported difficulties accessing the

delivery service due to long waiting lists, partial delivery of prescriptions, delivery to the wrong address and lack of a fixed schedule for delivery.

Medicine storage

Once participants received their prescriptions, they used various strategies to sort and store their medicines. In general, participants had developed their own bespoke storage systems and adhered to these systems as a matter of routine. It was not unusual for medicines to be dispensed out of their original packaging into participants' own containers—this included dispensing from standard medicine containers and from blister dispensing packs.

'Well I keep them in a container, in the same place because if I move things, I lose them. I just have the tablet and the capsule, that's all I have.' Participant 17, DSI

'Blister packs...I have given up on entirely and I just worked out my own system in getting them out in 7's... I've worked out a system of doing them so I know where I am. It's not the system that they write, partly because you can't read it and partly because they're all different.' Participant 20, VI

One participant systematically sorted and stored medicines in different places around the house according to their administration time.

'Very carefully. I put them in certain places so that I know I've taken that, I've taken that, that kind of thing.' Participant 22, DSI

Many of the participants used dosette boxes (multiple dispensing compartments divided by time and date) to sort and store their medicines and opinions about these varied, some found the devices helpful and others described difficulties with using them. Participants with VI often sought assistance to fill the dosette boxes.

'If it's simply a case of these little things with seven little boxes I can get somebody to do my own pills and put them in one of these...The girl who comes in and cleans for me.' Participant 3, VI

'I've got dosette boxes, I tried them once going on holiday because I was going for two weeks and honestly what a disaster it was... because of my vision...Just chaotic.' Participant 7, VI

Blister packets [multi-compartment compliance aids] that were pre-filled by pharmacists were used by a number of participants who described them as 'helpful' for organising their medicines. Some difficulties were also reported with blister packs including challenges with the dexterity required for 'popping' the tablet out of the foil bubble and with the colour and writing on the packets. Additionally, participants on warfarin found this method of storage unhelpful due to frequent dosing changes.

'It doesn't always come out and if it falls out or it bursts out and it bounces off and it disappears....why don't you just have

a little peel you can take off... I think a better designed blister pack that's easier to access.' Participant 5, DSI.

'When you look at it ...usually you get a lot of blue printed on white backgrounds which for me is just a killer but you learn after that.' Participant 5, DSI

'I've got one that you can't read the wordings that they've got on the pack, when you open your big cardboard pack and you take out your metal glittery pack, I can't read the lettering on that, unless again, I use these very strong lenses.' Participant 20, VI

One participant had indicated that waiting lists existed for blister packs, while another who had revealed their SI to the community pharmacy was prioritised for the blister pack.

'So when I went out I went to see [name] and I explained to them and they said 'no problem'. 'Sight loss, we've got a waiting list but we'll enter you onto the list and we'll get you started next week.' Participant 5, DSI

Medicine administration

In relation to medicine administration, most of the data reported here was from participants with VI. They described reliance on the texture and the colours of the boxes or the tablets. However, this was not always the case. Participants reported that most tablets were 'round; white, small and hard to distinguish'.

'I use anything. I use the shape sometimes. Some are long length wise, sometimes they're pointed at each end...I sort of become friends with them.' Participant 18, DSI

'I can hold them very close up to my eye, by which I mean about an inch away, and then I can identify the individual pills. But there is a tendency, I mean, a pink one for heart, for blood pressure and it becomes invisible if I put it on the palm of my hand. I know it sounds silly. It's vaguely flesh coloured and it literally disappears amongst the white pills' Participant 20, VI

Changing medicine brands was detrimental because it also meant changing the shapes and colours that people with VI used to distinguish their medicines and hence posed a risk to safe administration.

'I was complaining to my wife about feeling really light headed and that sometimes can be symptomatic of a hypo coming on... 'Are you sure you've been taking your medication right?' she said and I said, 'I don't know... so I got it out and bingo they had reintroduced the 4 mg tablets and I was taking 8 (4 mg) tablets a day instead of 8 (2 mg) tablets so my blood pressure just went right down.' Participant 5, DSI

There were reported instances of pharmacists being proactive and supportive in notifying the participant when these changes happened.

'Well he's excellent actually. If my medication has changed or if anything is different about it, he will phone and make sure I know what I am doing before I get it.' Participant 3, VI

Participants reported that they depended on their family/ carers to ensure safety with their medicines administration, and in the following extract helped to mitigate human error.

'I've actually had the wrong medicine supplied to me...and I was just about to take some tablets and [wife name] says to me 'what's that you've got now?' and I said 'it's my medicine' that I was put on... and she said 'that's not what you're on' and we looked at the packages. It wasn't even for me it was for a guy in the village three miles down the road.' Participant 4, VI

Some formulations (e.g. eye ointments, rectal suppositories, glucose test strips) were reported to be more difficult to manage by older people with VI. Problems with opening sealed bottles were exaggerated by fine tremors. Forgetfulness alongside their SI also amplified safety concerns.

'When you're blind you cannot really do ointments. Not into your eyes anyway.' Participant 4, VI

'Once I drop them and then I was in trouble because I only had to judge the size of the tablets and even with the magnifier it was difficult to tell.' Participant 16, DSI

'You know, over time you get used to knowing... you've got to have it in your head. If you were in any way going down the path of forgetfulness or dementia or something, it would become impossible because you wouldn't know which one you were looking at.' Participant 20, VI

Discussion

To our knowledge, this is the first in-depth exploration of the pharmaceutical care needs of community dwelling older people with SI and it highlighted the challenges encountered in their pharmaceutical care journey. A recently developed scale to assess the functional characteristics of older community dwelling people with pharmaceutical care needs does not specifically examine sensory changes [28]. Moreover, most research has focused on the pharmaceutical care of older people in residential care and nursing homes or examined the prescribing challenges for general practitioners and pharmacists. Some of the experiences described by participants in this study will be encountered by older people in general, however in many instances the issues identified are intensified by the presence of the SI impacting on all aspects of the pharmaceutical care journey.

As health services change from face-to-face to internet-based services, for example, for advice and ordering medicines, this creates both opportunities and challenges for older people with SI. Many older people may be reluctant to fully embrace the internet for services [29], or as in this study, require additional help from their carers to do so. Some older adults with SI might still prefer the personal, face-to-face contact with their pharmacist and findings from the study highlighted the significance of good communication between participants and community

pharmacist personnel. Furthermore, disclosure of SI can facilitate improved pharmaceutical care [21]. When communication is inadequate, for example, if advice is not heard properly or cannot be read, the potential for drug error increases. People with HI felt that they often misunderstood the information given about their medications by pharmacists in its entirety, but often gave the impression that they understood the pharmacists' instructions [29]. Whilst pharmacists believed that the provision of written information is a sufficient method of communication [23], it might result in important information being omitted due to time pressures and it also does not ensure that the patient understands or can read the information [18].

While some participants reported challenges with home medicines delivery in terms of reliability and delays, most were positive about the service. However, delivery systems may be operated independent of the community pharmacy and drivers who deliver the medication are not trained in pharmaceutical care which may pose safety concerns [30]. Whilst having assistance from family members or carers may help, this support is not always guaranteed and reinforces the need for safe delivery services.

People with SI reported creative strategies to manage their medicines. Participants had developed bespoke systems for storing and managing medicines in their home. Assistive aids such as blister packs and dosette boxes while helping with the organisation of medication may not be helpful for all older people, especially when limited dexterity is compounded by SI. Similar difficulties with medicine formulation, packaging and instructions have been reported with older people more generally [22]. Evidence also confirms that people with VI manage their medicines solely by memory to distinguish between medicines and dosages [13, 19]. Our data however showed how this approach may be compromised through the frequent changes in size and shape of prescription medication and alterations in the person's memory and cognition.

Recommendations

Our findings show that fragmented approaches that only seek to address one element of the complex medicine management challenges experienced by older people with sensory impairment receiving polypharmacy are inadequate. The reported experiences point to the need of system-focused solutions to provide continuous and integrated, person-centred support for this population in community settings. We need to improve the communication and data-sharing interface between general practice, community pharmacy, and carers.

Pharmaceutical care, just like any other form of support or assistance needed, could be further improved by involving all stakeholders in designing care pathways for ordering and managing medicines. Older adults placed at the centre of this effort can co-design acceptable, user-friendly and accessible solutions in collaboration with health care practitioners and assistive device manufacturers.

Limitations

The study generated rich data and a range of perspectives by interviewing people with SI. Study limitations include its relatively small sample size and focus in a country where access to healthcare, including medicines, is provided at no direct financial cost to the recipient. Findings may be transferable to individuals in similar circumstances. A detailed subgroup analysis in relation to specific experiences of people with vision vs hearing vs dual SI was not undertaken as a larger sample would be required to comprehensively capture people's experiences in each of the subgroups. In future, obtaining the perspectives of general practitioners and carers in addition to community pharmacists and service users would be desirable.

Conclusions

As the number of older people with SI and polypharmacy increases, adaptations are needed for the provision of pharmaceutical care to this population. Greater service user involvement in the design of services is desirable. A bespoke initiative to work collaboratively with home-dwelling older adults, carers, general practitioners and community pharmacists in urban and rural communities in co-designing support systems could complement this work. Clearly, a system-wide approach is needed to address the complex requirements and to provide continuous and integrated pharmaceutical care of this population as their needs and assistive requirements change over time.

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References

1. Garin N, Koyanagi A, Chatterji S *et al.* Global multimorbidity patterns: a cross-sectional, population-based, multi-country study. *J Gerontol A Biol Sci Med Sci* 2015; 71: 205–14. <https://www.ncbi.nlm.nih.gov/pubmed/26419978>.
2. Ryan C, O'Dwyer M. Pharmaceutical care in the aged. In: Alves da Costa F, van Mil J, Alvarez-Risco A, eds. *The Pharmacist Guide to Implementing Pharmaceutical Care*. Cham: Springer, 2019; 299.

3. Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet* 2012; 380: 37–43.
4. Matthews FE, Chatfield M, Brayne C. An investigation of whether factors associated with short-term attrition change or persist over ten years: data from the Medical Research Council Cognitive Function and Ageing Study. *BMC Public Health* 2006; 6: 185.
5. Pan CW, Qian DJ, Sun HP, Ma Q, Xu Y, Song E. Visual impairment among older adults in a rural community in eastern China. *J Ophthalmol* 2016; 2016: 1–6.
6. Crews JE, Campbell VA. Vision impairment and hearing loss among community-dwelling older Americans: implications for health and functioning. *Am J Public Health* 2004; 94: 823–9.
7. Davenport SL. Minnesota DeafBlind Technical Assistance Project: The Five Senses and Communication. Minneapolis, MN: Minnesota DeafBlind Technical Assistance Project, 2007. <http://www.dbproject.mn.org/fivesenses.html?css=grtext:%202007> (accessed 2 April 2019).
8. Duerden M, Avery T, Payne R. Polypharmacy and Medicines Optimisation. Making It Safe and Sound. London: The King's Fun, 2013.
9. Masnoon N, Shakib S, Kalisch-Ellett L, Caughey GE. What is polypharmacy? A systematic review of definitions. *BMC Geriatr* 2017; 17: 230.
10. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990; 47: 533–43.
11. Scottish Government. The Scottish health survey: older people's health; 2011. www.gov.scot/resource/doc/363507/0123373.pdf (accessed 2 April 2019).
12. Cahir C, Bennett K, Teljeur C, Fahey T. Potentially inappropriate prescribing and adverse health outcomes in community dwelling older patients. *Br J Clin Pharmacol* 2014; 77: 201–10.
13. Zhan C, Sangl J, Bierman AS et al. Potentially inappropriate medication use in the community-dwelling elderly: findings from the 1996 Medical Expenditure Panel Survey. *JAMA* 2001; 286: 2823–9.
14. Budnitz DS, Lovegrove MC, Shehab N, Richards CL. Emergency hospitalizations for adverse drug events in older Americans. *N Engl J Med* 2011; 365: 2002–12.
15. Hawkins SF, Nickman NA, Morse JM. The paradox of safety in medication management. *Qual Health Res* 2017; 27: 1910–23.
16. McCann RM, Jackson AJ, Stevenson M, Dempster M, McElnay JC, Cupples ME. Help needed in medication self-management for people with visual impairment: case-control study. *Br J Gen Pract* 2012; 62: 530–e537.
17. Hyoguchi N, Kobayashi D, Kubota T, Shimazoe T. Effects on deaf patients of medication education by pharmacists. *J Deaf Stud Deaf Educ* 2016; 21: 416–21.
18. Kentab BY, Al-Rowiali KZ, Al-Harbi RA, Al-Shammari NH, Balhareth WM, Al-Yazeed HF. Exploring medication use by blind patients in Saudi Arabia. *Saudi Pharm J* 2015; 23: 102–6.
19. Zhi-Han L, Hui-Yin Y, Makmor-Bakry M. Medication-handling challenges among visually impaired population. *Arch Phar Pract* 2017; 8: 8–14.
20. Alhusein N, Macaden L, Smith A et al. 'Has she seen me?' a multiple methods study of the pharmaceutical care needs of older people with sensory impairment in Scotland. *BMJ Open* 2018. doi:10.1136/bmjopen-2018-02319.
21. Killick K, Macaden L, Smith A, Kroll T, Stoddart K, Watson MC. A scoping review of the pharmaceutical care needs of people with sensory loss. *Int J Pharm Pract* 2018; 26: 380–6. doi:10.1111/ijpp.12456.
22. Parekh N, Gahagan B, Ward L, Khalid A. 'They must help if the doctor gives them to you': a qualitative study of the older person's lived experience of medication-related problems. *Age Ageing* 2019; 48: 147–51.
23. Alhusein N, Killick K, Macaden L et al. 'We're really not ready for this': a qualitative exploration of community pharmacy personnel's perspectives on the pharmaceutical care of older people with sensory impairment. *Disabil Health J* 2019; 12: 242–8. doi:10.1016/j.dhjo.2018.10.006.
24. Etikan I, Musa SA, Alkassim RS. Comparison of convenience sampling and purposive sampling. *Am J Theor Appl Stat* 2016; 5: 1–4.
25. Accessibility Requirements for People with Low Vision 2016 <https://www.w3.org/TR/low-vision-needs/> (accessed 2 April 2019).
26. Fusch PI, Ness LR. Are we there yet? Data saturation in qualitative research. *Qual Report* 2015; 20: 1408–16.
27. Campbell JL, Quincy C, Osserman J, Pedersen OK. Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Social Methods Res* 2013; 3: 294–320.
28. Sourbati M. 'It could be useful, but not for me at the moment': older people, internet access and e-public service provision. *New Media Soc* 2009; 11: 1083–1100.
29. Ferguson M, Liu M. Communication needs of patients with altered hearing ability: informing pharmacists' patient care services through focus groups. *J Am Pharm Assoc* 2015; 55: 153–60.
30. Chawla DS. Poor medicines delivery practices prompt safety review. *Pharm J* 2017. <https://www.pharmaceutical-journal.com/news-and-analysis/news/poor-medicines-delivery-practices-prompt-safety-review/20203050.article?firstPass=false> (accessed 2 April 2019). doi:10.1211/PJ.2017.20203050.

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