Exploratory Research in Clinical and Social Pharmacy 15 (2024) 100467

Contents lists available at ScienceDirect

Exploratory Research in Clinical and Social Pharmacy

journal homepage: www.elsevier.com/locate/rcsop

Assistive products in pharmacy practice to optimize medications use for visually impaired patients: Focus groups to explore community pharmacists' opinions and expectations

Théodora Merenda [a,*], Sofia Cannella [a], Jennifer Denis [b], Stéphanie Patris [a]

[a] Unit of Clinical Pharmacy, Faculty of Medicine and Pharmacy, University of Mons (UMONS), Avenue du Champ de Mars 25, Mons, Belgium
[b] Unit of Clinical Psychology, Faculty of Psychology and Education, University of Mons (UMONS), Place du Parc 14, Mons, Belgium

ARTICLE INFO

Keywords:
Visual impairment
Assistive products
Focus groups
Pharmacy practice
Medication use

ABSTRACT

Background: Visual impairment can significantly affect a person's ability to take medications safely. Therefore, pharmacists need to ensure safe and effective access to medication information, particularly through the use of assistive products, which are devices that compensate for partial or total vision loss. Although assistive products are used by visually impaired patients for activities of daily living, their use in medication management needs to be more widespread.

Objective: The study aimed to investigate community pharmacists' opinions and excpectations on the use of assistive products in pharmacy practice to optimize and secure medications use for visually impaired patients. The goal is to transfer these assistive products to pharmacy practice.

Methods: Focus groups were conducted with 6 French-speaking community pharmacists via videoconference in Belgium, following the principle of participatory action-research. The participants were recruited voluntarily, and moderator's guides were developed to lead the discussion. The focus groups were recorded, transcribed verbatim, and analyzed in a double-blind fashion using thematic analysis. The data were organized by NVivo software.

Results: Four themes were identified: easy-to-use assistive products according to pharmacists, usefulness of assistive products in pharmacy practice, barriers to the use of assistive products, and potential solutions. According to community pharmacists, certain assistive products were deemed easy-to-use and transferable to pharmacy practice.

Conclusions: This qualitative study demonstrates the transferability of assistive products to pharmacy practice for visually impaired patients in medications use. The study taken into account the patient's profile and the multidisciplinary approach, which community pharmacists consider essential.

1. Introduction

In 2022, the World Health Organization estimated that at least 2.2 billion people worldwide have a visual impairment (VI) affecting their near or distance vision.[1] It is important to note that VI can affect all age groups[2,3] and can therefore have harmful consequences for a person's well-being, health, and functional autonomy. Reduced visual acuity can affect a patient's ability to take their medications safely.[4] Patients with this condition may have difficulty reading expiration dates[5] and dosage labels.[6] The administration of certain medications, particularly liquid dosage forms, can be complex. Visually impaired patients may face challenges when reading the graduations on administration devices, such as syringes.[7,8] Additionally, administering insulins and eye drops can be difficult, and opening some medication packages may pose a challenge.[9] Identifying medications can be a challenge for visually impaired patients due to the lack of contrast between the text and the background on packaging, which may not always appropriate.[10] Moreover, distinguishing between different tablets is often based on their color, shape, and size.[11] A study by Kentab et al.[6] reveals that some visually impaired patients may take the wrong dose or medication, which can lead to serious consequences such as medication errors or overdoses.[5]

Pharmacists should take steps to identify and welcome patients with VI so that pharmaceutical care can be adapted to this impairment. One

* Corresponding author at: University of Mons, Avenue du Champ de Mars 25, Building 6, 7000 Mons, Belgium.
E-mail addresses: theodora.merenda@umons.ac.be (T. Merenda), jennifer.denis@umons.ac.be (J. Denis), stephanie.patris@umons.ac.be (S. Patris).

https://doi.org/10.1016/j.rcsop.2024.100467
Received 8 April 2024; Received in revised form 30 May 2024; Accepted 14 June 2024
Available online 15 June 2024

possible adaptation to ensure access to medication information is to use the assistive products (AP) that these patients use in their activities of daily living. If the patient is not familiar with the use of AP, the pharmacist can refer them to functional rehabilitation centers to obtain adapted AP and other resources.[12] Community pharmacists therefore have an important role to play in transferring AP recommended by ergotherapists into pharmacy practice and in improving the safety of visually impaired patients in the use of their medications. However, pharmacists are not always aware of these services.[12]

The ISO 9999 classification[13] defines AP as devices that assist with mobility, communication, activities of daily living, and other areas. They are an essential component of visual rehabilitation, which encompasses various fields, such as ophthalmology, optometry, psychology, sociology, and other disciplines that contribute to the improvement of visual performance and optimal participation in daily activities.[14] AP serve to compensate for partial or total vision loss, enabling individuals to achieve independence and perform daily tasks affected by disability (e.g. an AP can be a label reader that allows pre-recorded information to be read out by voice).[15,16]

The scientific literature lacks information regarding the needs of visually impaired patients and the optimization of their medications use.[13,17] In this context, it is necessary to take additional measures to address the challenges faced by visually impaired patients in Belgium when it comes to taking medications. This research focuses on the transferability of AP currently used in activities of daily living to management of medications. Therefore, the objective of the study is to investigate community pharmacists' opinions and expectations regarding the use of AP in pharmacy practice to optimize and secure medications use for visually impaired patients.

2. Methods

2.1. Study design

The methodology used involved of conducting single-category focus groups (FG) with community pharmacists practicing in Belgium[18] to investigate the use of AP in pharmacy practice. Indeed, in the field of pharmacy practice, it is important to ensure that patients are able to recognize their medications and administer the correct dose. Additionally, it is necessary to identify, for example, information on the correct use of medications that is relevant for the pharmacist to record on labels and QR codes. For these reasons, the study was conducted with pharmacists to identify the most suitable AP for carrying out these tasks. This study is based on the principle of participatory action-research, a collaborative way of conducting research and co-producing knowledge (e.g. developing recommendations).[19] This approach uses a qualitative data collection method and a cyclical process.[20] In this way, moderator's guides were developed to define the conduct of the FG. Each FG had different objectives and its own guide (Appendix A). Indeed, after each FG, a new moderator's guide was developed based on the results of the previous FG to follow the cyclical process (Fig. 1). It was therefore important to conduct each FG with the same group of pharmacists.

- **FG 1**: Gather pharmacists' opinions on AP.
- **FG 2**: Provide further details on the issues raised in the first FG.
- **FG 3**: Summarize and refine the main concepts that emerged from the 2 FG.

The moderator's guides were developed using Hurworth's triangular model.[21] They included a general opening question, followed by a series of transitional questions that led to the key questions.[21,22] The open-ended questions were simple and used precise scientific vocabulary. The research team internally validated the moderator's guides.

Furthermore, before starting the first FG, the moderator (TM) provided training on AP that could be applied to pharmacy practice. The training was developed based on a literature review and observations of ergotherapy sessions and was presented via a PowerPoint shared directly on the Teams application. The presentation was emailed to participants who were unable to attend the first FG. These elements, together with predefined topics, were used to develop the first moderator's guide. The AP presented during the training have been grouped into 4 categories and are presented in Table 1.

2.2. Selection criteria

The study included French-speaking community pharmacists who were owner or non-owner, practicing in the Walloon or the Brussels-Capital regions. Hospital pharmacists and pharmaceutical-technical assistants were excluded.

Participants were recruited on a voluntary basis. For this purpose, community pharmacists were contacted by telephone, and TM briefly explained the study objectives and procedure. The availabilities of pharmacists who wished to participate in the study were checked, and appointments were then made at a time when all participants could attend. The desired sample size was of 5 to 8 participants per FG[18,22] to encourage a productive discussion in which all participants could contribute.[24] A total of 12 pharmacists were contacted, of whom 4 declined to participate in the study due to a lack of time. Eight pharmacists initially agreed to participate, but one was excluded from the study due to his status as a hospital pharmacist and another additional pharmacist later withdrew.

2.3. Data collection

FG were conducted via videoconference using the Microsoft Teams application by TM in November and December 2022. The FG were held

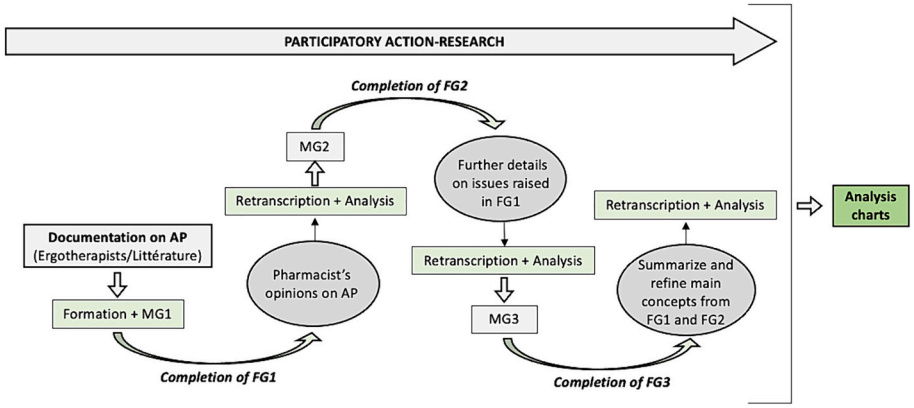

Fig. 1. Modeling the cyclical process of the research. AP: assistive products, FG: focus group, MG: moderator's guide.

Table 1
Categories and definitions of assistive products.[23]

Categories	Assistive products	Definitions
Category 1 ***Useful reading assistive products***	Optical glasses magnifier	Converging lens used to enlarge the image of a text or object.
	Pocket-size video magnifier	Compact and lightweight device that enlarges the image of a text or object thanks to an LCD screen and HD camera with auto-focus. The screen can be folded for a comfortable reading position.
	Digital desktop magnifier	Fixed screen for reading a document placed on a moving platen, under a camera or under a mobile enlarger.
	Voice reader	Scanner-like device for voice-reading of typed documents.
	Braille strip	Device that allows digital information from a computer, smartphone or tablet to be read in Braille characters on the strip by means of spikes that move up and down.
Category 2 ***Assistive products for medical parameters***	Sound thermometer	Voice-activated devices for reading medical parameters aloud (temperature, blood pressure and glycemia respectively). Sound tensiometers and glucometers also include dictation of the procedure to be followed for correct measurement of the desired medical parameter.
	Sound tensiometer	
	Sound glucometer	
Category 3 ***Assistive products for taking medications***	Traditional pill organizer	Pill organizer equipped with raised dots to facilitate the identification of the days of the week, and a push-button mechanism to ensure the delivery of the optimal dose.
	Electronic pill organizer	Automatic pill organizer that provides a reminder with sound and light when it is time to take medications. The right dose is delivered directly into the compartment provided.
	Eyedrop guide	Plastic devices into which the bottle is placed to facilitate instillation of the eye drops. Models vary according to container.
	Label reader (pen)	Pen equipped with raised labels that facilitate the reading aloud of pre-recorded information. The information is audible when the label is scanned with the pen.
Category 4 ***Mobile applications***	Label reader	Application with embossed labels for reading aloud pre-recorded information. The information is audible when the sticker is scanned by the application on the phone.
	QR code reader	Application for voice-activated reading of QR codes after they have been created.
	Text reader	Application for reading aloud typed documents via phone scan.

about a week apart, on 15/11, 23/11, and 05/12. Simple instructions were provided to the pharmacists to ensure the smooth running of the FG sessions. The FG sessions lasted an average of (84 ± 22) minutes and were recorded directly into the application to facilitate transcription and relieve the primary observer (SC) from continuous notetaking.[25] Before starting the FG, TM obtained the pharmacist's consent to record the FG. Data collection took place in the presence of 3 researchers, each with a specific role: TM led FG[26] and managed the group dynamics, time, and objectives; SC managed the recording and noted elements that required further clarification[26]; SP acted as a secondary observer and suggested additional questions on important points that were not covered. At the end of the FG, SC reviewed the key ideas and confirmed with all participants that nothing had been overlooked. Following each FG, TM, SC, and SP held a debriefing session to summarize the ideas presented and note important considerations for the remainder of the study.

2.4. Data analysis

Each FG was transcribed verbatim into a separate Word document by SC [22]. The transcription process was carried out shortly after the FG to ensure that the main points made were retained.[27] It took approximately 16 to 24 h per FG, depending on the length of the meeting and other parameters. TM and SC conducted a double-blind analysis for each FG based on the 6 phases of Braun & Clarke's thematic analysis using an inductive approach.[27] This analysis phase was performed in parallel with the data collection phase using NVivo 12 and took one day to complete.

2.5. Trustworthiness

This qualitative research was reported following the SRQR checklist[28] and trustworthiness was assessed according to the criteria defined by Korstjens et al.[29] The credibility of the study was promoted by 3 distinct strategies: extended engagement, persistent observation, and triangulation (double-blind analysis). The double-blind analysis of the data was conducted, including a comparison of the databases, to avoid any bias in interpretation or data selection, and to ensure consistency in the analysis.[29] Transferability was ensured by providing a thick description of the study context. Finally, dependability was promoted through a strict adherence to the 6 phases of thematic analysis.[27] The researchers familiarized themselves with the data by reading the transcripts several times. They labeled and named relevant text extracts, created themes and sub-themes, and refined them until a coherent model was obtained.

2.6. Ethics approval

The study protocol was approved by the Ethics Committee of the Faculty of Psychology and Education of the University of Mons on 10 June 2022 (file number: 100622TM). All participants signed an informed consent. Additionally, during transcription, all data were pseudonymized according to the following convention: the letters FGPh standing for “focus group pharmacist” were associated with 2 numbers.

3. Results

The FG facilitated a comprehensive investigation on the question of the transferability of AP in Belgian pharmacy practice to optimize and

Table 2
Sociodemographic data of the sample ($n = 6$).

Pharmacists	Participation in FG	Gender	Province of profession	Status	Experience (years)
Ph1	1, 2	W	Hainaut	Assistant	20 years
Ph2	2, 3	W	Hainaut	Owner	15 years
Ph3	1, 3	W	Hainaut	Owner	23 years
Ph4	1, 2, 3	M	Namur	Owner	12 years
Ph5	1, 2, 3	W	Namur	Owner	10 years
Ph6	1, 2, 3	W	Brussels	Owner	7 years

FG: focus group; M: man; W: woman. Ph1 and Ph3 were personally unable to attend the meeting at the last minute, while Ph2 experienced a technical difficulty and was therefore unable to attend.

secure medications use for visually impaired patients. Table 2 presents the pharmacists' sociodemographic information.

Four themes emerged from the anchored data, which were further divided into 17 sub-themes (Table 3). The themes are presented separately and are illustrated with relevant verbatim excerpts (these excerpts were translated as they were selected, and the accuracy of the translation was checked by a translator who had the French and English versions of the manuscript).

3.1. Theme 1: easy-to-use assistive products according to pharmacists

Out of the various AP presented in the training, 7 were considered easy-to-use in pharmacy practice, and useful for visually impaired patients. These included traditional and electronic pill organizers, label and QR code readers, and devices to measure medical parameters, such as sound thermometers, tensiometers, and glucometers (Fig. 2). Community pharmacists have also suggested the possibility of using several AP in combination.

> *"If I manage it, I have a look at the device before it arrives. I tell the patient to come in the next day, they pick it up and we do it together. That's it, glucometer, same principle, so these are the ones that really seemed easiest to me, providing I can order them from my medication suppliers.",* FG1Ph6 (7 years' experience).

3.2. Theme 2: usefulness of assistive products in pharmacy practice

Community pharmacists suggested that pill organizers can be used for patients on chronic treatment: the traditional pill organizer is affordable and easy-to-use, and the electronic pill organizer can promote adherence through sound reminders.

> *"[For electronic pill organizers], I find that just the fact that there's a reminder to take it can be useful for anyone who has memory problems. […] it needs to be much better known and more widespread.",* FG2Ph6 (7 years' experience).

The label and QR code readers were considered suitable for use in the pharmacy practice to obtain audio information about acute treatment when patients have difficulty reading. Pharmacists discussed relevant information that could be recorded with these readers, such as medication name, dosage, indication, etc. Additionally, the QR code can be used to link audio-visual content demonstrating the correct administration of specific pharmaceutical forms (e.g. inhalation devices) to ensure the correct medications use.

Table 3
Main themes and sub-themes resulting from the analysis.

Themes	Sub-themes
Easy-to-use assistive products according to pharmacists	Pill organizers
	Readers
	Devices used to measure medical parameters
Usefulness of assistive products in pharmacy practice	Obtention of vocal information
	Inclusion of audio-visual content
	Chronic treatment
	Acute treatment
	Patient adherence
Barriers to the use of assistive products	Technology
	Pharmaceutical forms
	Pill organizers characters
	Pill organizers format
	Too much information
Potential solutions	Alternative tablet form
	Conciseness of information
	Combination of a maximum of 2 assistive products
	Choice adapted to patient's profile

> *"I always come back with my little QR codes which provide information that the patient can hear, relay it to a short video and that's it, nothing more, and of course pay attention to the font, so we know how to adapt it, but otherwise, nothing more.",* FG2Ph1 (20 years' experience).

> *"The first thing I would say is the name of the medication, so for example, 'paracetamol', specifying the dosage '1 g', for an adult 1 tablet 3 times a day and maybe what it's used for, pain, fever.",* FG2Ph6 (7 years' experience).

Finally, community pharmacists have suggested that devices with a voice function for measuring medical parameters could aid visually impaired patients in taking medical measurements.

3.3. Theme 3: barriers to the use of assistive products

Community pharmacists have identified pharmaceutical forms as a significant barrier to the use of pill organizers. This is because certain medications require specific storage conditions and cannot be unpacked in advance. For example, effervescent tablets cannot absorb moisture. Furthermore, medications that need refrigeration or are in liquid form are not suitable for pill organizers. Pill organizers have a limited compartment size, which makes it challenging to store multiple capsules or tablets for a course of treatment. Electronic pill organizers have the added disadvantage of being bulky, making transportation difficult. Traditional pill organizers pose a challenge for visually impaired patients, who need to identify boxes by touch or memory, due to their small size and low contrast characters. Finally, the excessive amount of information recorded on label and QR code readers can be a barrier to their use. It is important to consider these limitations when selecting a pill organizer.

> *"Often, people say pill organizers for patients with polypharmacy, but I agree with what has been said, the boxes are microscopic.",* FG2Ph6 (7 years' experience).

> *"Often, the pill organizers big forgotten items are the Riopan® pod (Magaldrate), the Lactulose spoon and the Movicol® sachet (Macrogol and electrolytes). […] we can also consider the various eye drops, so there you go.",* FG2Ph6 (7 years' experience).

Community pharmacists emphasized the importance of digitization and the need for visually impaired patients to have access to technology, which can be a significant barrier. They believed that the multiplication of AP was not appropriate for the management of medications for these patients.

> *"Because it means multiplying… saying "oh, I've got to go to my pen, oh, I've got to go to my QR code, oh, I've got to go to my phone", […] it might mean choosing a support and, if possible, using almost only that.",* FG2Ph5 (10 years' experience).

3.4. Theme 4: potential solutions

Community pharmacists have proposed various solutions to encourage the use of AP in pharmacy practice. One solution is to offer tablet alternatives for pharmaceutical forms that cannot be accommodated by pill organizers. Alternatively, pharmacists suggested providing information about these forms through label or QR code readers. It is important to keep the information on these readers concise to ensure their ease of use. Moreover, they recommended a combination of no more than 2 AP and felt that these AP should be adapted to the patient's profile and their access to technology. For example, according to community pharmacists, an electronic pill organizer may be appropriate for patients with memory problems but could be challenging for those with dexterity problems or tremors.

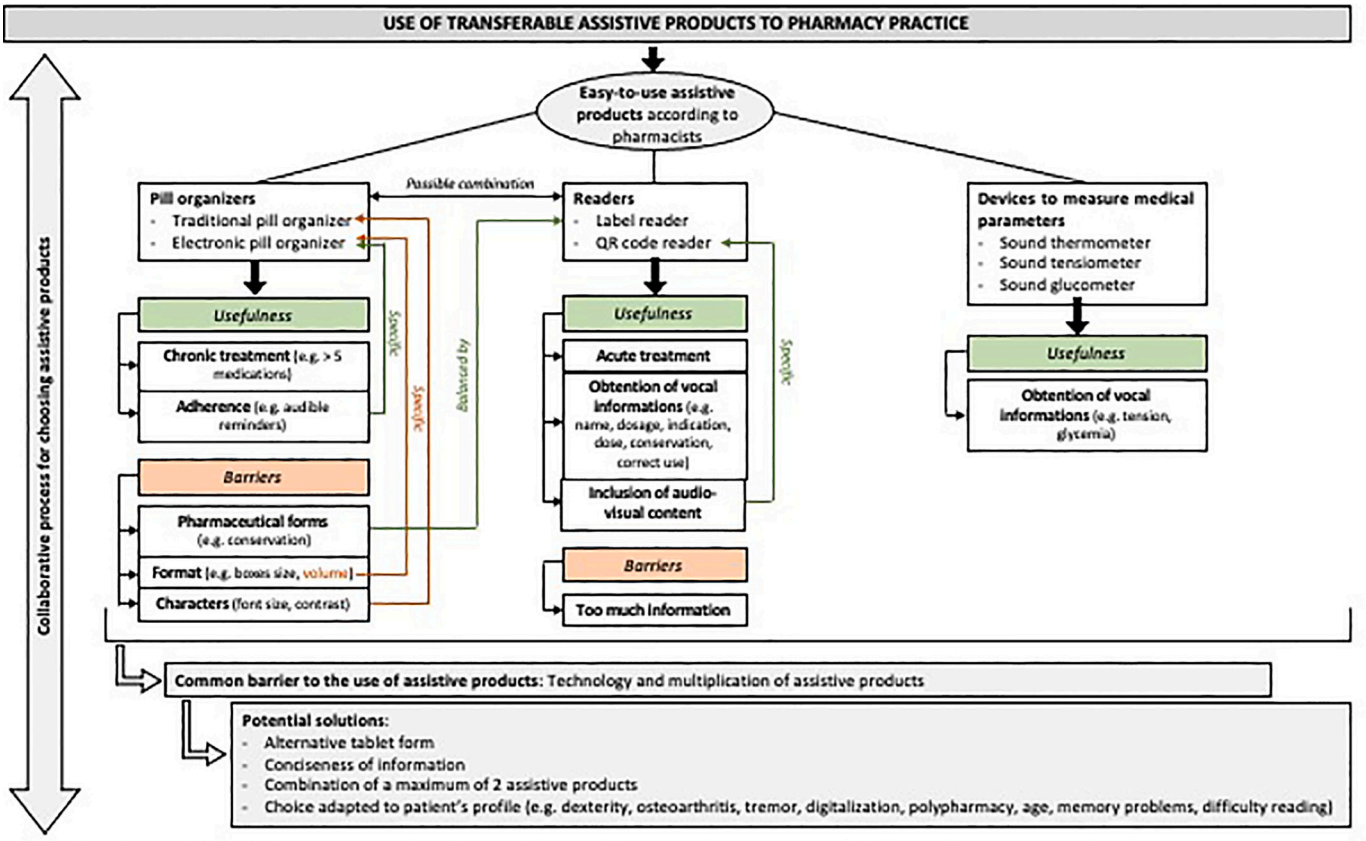

Fig. 2. Schematization of the use of transferable assistive products to pharmacy practice for visually impaired patients.

"I don't know how long these messages can last because they have to be quite short, otherwise the person will have taken up the whole box before they get to the end of it.", FG2Ph4 (12 years' experience).

"I think it's aimed more at relatively young visually impaired people because it requires dexterity that can sometimes be a problem for an older person.", FG2Ph4 (12 years' experience).

4. Discussion

Seven AP were identified as easy-to-use by community pharmacists, of which 6 could be transferred to pharmacy practice to optimize and secure medications use for visually impaired patients. Indeed, traditional pill organizers are already used by pharmacists. These results are consistent with certain articles in the scientific literature. The label reader was previously presented in an article aimed at pharmacists.[30] A study was conducted on visually impaired patients who met specific criteria, including comfort with technology, to evaluate various mobile applications.[31] Additionally, a study demonstrated that people with mild cognitive impairment could use the DoseControl® electronic pill organizer.[32] This device, or an equivalent, could also be adapted for use by visually impaired patients due to its user-friendly design. This shows that AP can be applied to pharmacy practice, as well as activities of daily living.

Before implementing AP in pharmacy practice, it is essential to interview patients to determine their visual abilities and needs. Colenbrander's classification[33] can be used to identify the degree of VI and promote the most appropriate use of AP. However, it is important to note that the visually impaired population is highly heterogeneous, and the adaptive abilities of a person with early VI differ from those with progressive vision loss. Collaboration between healthcare professionals is therefore essential. In this context, ergotherapists are the most qualified professionals to determine the most appropriate AP for each patient. Additionally, studies suggest that visually impaired patients may experience joint diseases, tremors, and cognitive impairments, among other problems. It is also important to consider the technology divide, particularly with older people, which can make it difficult for some individuals to use technology.[34,35]

Several studies in the USA[10] and the UK[36] have proposed recommendations to improve the appropriate use of medications by people with VI. These recommendations include the use of minimum font sizes and specific font styles, as well as providing general information about therapeutic alternatives, resources, and services that community pharmacists can offer to their visually impaired patients. Nevertheless, these recommendations alone may not be sufficient to improve the daily medication intake of visually impaired patients. It should be noted that the Belgian pharmaceutical system differs from both the American and British systems. To overcome this problem and optimize medications use for visually impaired patients in Belgian community pharmacies, it is essential to transfer AP to pharmacy practice. Pharmacists require quality recommendations to achieve this goal. The visually impaired population is a diverse group and requires special attention for appropriate pharmaceutical care and the use of appropriate AP. Criteria, such as the patient's profile, treatment type, and access to the technology must be considered. Therefore, it is essential to obtain the patients' opinions on medication management and their experience with AP to promote a patient-as-partner approach.[37]

4.1. Strengths and limitations

Researchers from the Clinical Pharmacy Department (TM and SP) conducted the FG, along with a final-year pharmacy student (SC) who received an introduction to qualitative research from TM before the study to familiarize herself with key concepts. Moreover, the

researchers' pharmaceutical background may have influenced the data collection.

Recruitment bias was identified as an issue, as the most motivated and involved pharmacists were more likely to agree to participate in the study. Furthermore, the sample size was identified as a limitation, with only 5 pharmacists present per focus group, which is below the minimum size required to ensure sufficient diversity in the data collected.[18] It is also important to note that not all of the recruited pharmacists were present at the 3 FG. The pharmacist who was absent at the lambda FG may have missed important information necessary to understand the subsequent meeting, which could have affected their thought process and responses to the questions asked, as well as the group dynamics. As previously described in the literature, a dominant person in the FG can influence the course of the meeting.[22] To compensate for this potential bias, TM tried to provide all pharmacists with an opportunity to speak.

Ultimately, it was decided that only SC would transcribe the FG, resulting in TM not carrying out this transcription phase. This made the data analysis more laborious and time-consuming. Therefore, in the first phase of thematic analysis, multiple re-readings were necessary to conduct a quality analysis.[27]

5. Conclusions

The use of assistive products is an interesting solution to be transferred to pharmacy practice to optimize and secure medications use for visually impaired patients. The conducted focus groups identified important aspects regarding assistive products. The study reveals that assistive products to be transferred to pharmacy practice should be easy-to-use. A multidisciplinary approach, particularly involving ergotherapists, should be employed to select assistive products that best adapt the profile of visually impaired patients. Therefore, clear and user-friendly recommendations for community pharmacists need to be developed, validated, and implemented in the long term. Although AP are a viable solution, additional recommendations and tools are required to ensure that pharmaceutical practices are adapted to each patient.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Théodora Merenda: Writing – review & editing, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **Sofia Cannella:** Writing – original draft, Investigation, Formal analysis. **Jennifer Denis:** Writing – review & editing, Methodology, Conceptualization. **Stéphanie Patris:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

The authors would like to thank the community pharmacists for their commitment and participation in the study, and ergotherapists from *Les Amis des Aveugles* to help with the choice of assistive products.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2024.100467.

References

1.. World Health Organisation, WHO. Blindness and visual impairment. Available from https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment; 2023. Accessed 28.03.24.
2. Bourne RRA, Flaxman SR, Braithwaite T, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 2017;5(9):e888–e897. https://doi.org/10.1016/S2214-109X(17)30293-0.
3. Flaxman SR, Bourne RRA, Resnikoff S, et al. Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. *Lancet Glob Health*. 2017;5(12):e1221–e1234. https://doi.org/10.1016/S2214-109X(17)30393-5.
4. McCann RM, Jackson AJ, Stevenson M, et al. Help needed in medication self-management for people with visual impairment: case-control study. *Br J Gen Pract*. 2012;62(601):530–537.
5. Zhi-Han L, Hui-Yin Y, Makmor-Bakry M. Medication-handling challenges among visually impaired population. *Arch Pharm Pract*. 2017;8(1):8. https://doi.org/10.4103/2045-080X.199613.
6. Kentab BY, Kholuod ZA, Rehab AA, et al. Exploring medication use by blind patients in Saudi Arabia. *Saudi Pharm J*. 2015;23(1):102–106. https://doi.org/10.1016/j.jsps.2014.05.002.
7. Smith M, Bailey T. Identifying solutions to medication adherence in the visually impaired elderly. *Consult Pharm*. 2014;29(2):131–134. https://doi.org/10.4140/TCP.n.2014.131.
8. Cupples ME, Hart PM, Johnston A, et al. Improving healthcare access for people with visual impairment and blindness. *Br Med J*. 2012;344, e542. https://doi.org/10.1136/bmj/e542.
9.. National Academies of Sciences E, Division H and M, Practice B on PH and PH, et al. *Making Eye Health a Population Health Imperative: Vision for Tomorrow*. Washington (DC): National Academies Press (US); 2016. Available from https://pubmed.ncbi.nlm.nih.gov/27656731/. Accessed 04.12.22.
10. Orrico KB. Caring for visually impaired patients. *J Am Pharm Assoc*. 2013;53(3):e142–e150. https://doi.org/10.1331/JAPhA.2013.13514.
11.. Barnett N, Amani EB, Hugh H, et al. How to support patients with sight loss in pharmacy. Available from https://pharmaceutical-journal.com/article/ld/how-to-support-patients-with-sight-loss-in-pharmacy; 2017.
12. Merenda T, Denis J, Patris S. Pharmaceutical care for visually impaired patients: a qualitative study of community pharmacists' needs and professional experience. *Int J Clin Pharm*. 2024;46(1). https://doi.org/10.1007/s11096-023-01684-9.
13.. International Standard Organisation 9999, ISO 9999. Assistive products - Classification and terminology. Available from https://cdn.standards.iteh.ai/samples/72464/3f3608ed0bff4545bd53c02373f8cdbb/ISO-9999-2022.pdf; 2022. Accessed 28.03.24.
14. Bauer SM, Elsaesser LJ, Arthanat S. Assistive technology device classification based upon the World Health Organization's, international classification of functioning, disability and health (ICF). *Disabil Rehabil Assist Technol*. 2011;6(3):243–259. https://doi.org/10.3109/17483107.2010.529631.
15. Holzschuch C, Fays A. L'intervention auprès des personnes âgés présentant une déficience visuelle. (Working with older visually impaired persons). *De Boeck Supérieur*; 2012. Available from https://www-cairn-info.ezproxy.ulb.ac.be/ergotherapie-en-geriatrie–9782353270590-page-323.htm. Accessed 18.03.23.
16. Bouly de Lesdain A. Orthoptiste au CAMSP. *Contraste*. 2010;33(2):259–277. https://doi.org/10.3917/cont.033.0259.
17.. Association Pharmaceutique Belge, APB. Rôle et tâches principales : les soins pharmaceutiques. (Role and main tasks: pharmaceutical care). Available from https://www.apb.be/fr/corp/Le-pharmacien/role-et-taches-principales/Pages/Soin-pharmaceutique.aspx; 2021. Accessed 22.01.24.
18. Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research*. Newbury Park: Sage; 2000.
19.. Buckles D. Parcipatory Action Research : theory and methods for engaged inquiry. Available from https://www.researchgate.net/publication/331183566_Participatory_Action_Research_Theory_and_Methods_for_Engaged_Inquiry; 2019. Accessed 15.03.24.
20. Cornish F, Breton N, Moreno-Tabarez U, et al. Parcipatory action research. *Nat Rev Methods Primers*. 2023;3(34):1–14. https://doi.org/10.1038/s43586-023-00214-1.
21. Hurworth R. Qualitative methodology: common questions about running focus groups during evaluations. *Eval News Comment*. 1996;5(1), 48–9, 52.
22. Plummer-D'Amato P. Focus group methodology part 1: considerations for design. *Int J Ther Rehabil*. 2008;15(2):69–73. doi:10.12968:ijtr.2008.15.2.28189.
23.. Handicat. Handicap et aides techniques – ISO 9999. (Disability and technical aids – ISO 9999). Available from https://handicat.com/iso.php; 2023. Accessed 30.05.24.
24. Hennink M, Hutter I, Bailey A. *Qualitative Research Methods*. London: Sage publications; 2020.
25. Whiting LS. Semi-structured interviews: guidance for novice researchers. *Nurs Stand*. 2008;22(23):35–40. https://doi.org/10.7748/ns2008.02.22.23.35.c6420.
26. Nibbeling N, Simons M, Sporrel K, et al. A focus group study among inactive adults regarding the perceptions of a theory-based physical activity app. *Front Public Health*. 2021;9, 528388. https://doi.org/10.3389/fpubh.2021.538288.
27. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101. https://doi.org/10.1191/1478088706qp063oa.
28. O'Brien BC, Harris IB, Beckman TJ, et al. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med*. 2018;89(9):1245–1251. https://doi.org/10.1097/ACM.0000000000000388.

29. Korstjens I, Albine M. Series: practical guidance to qualitative research. Part 4: trustworthiness and publishing. *Eur J Gen Pract.* 2018;24(1):120–124. https://doi.org/10.1080/13814788.2017.1375092.
30. Rapin A. Accueil des patients déficients visuels et auditifs à l'officine. *Actual Pharmacol.* 2016;55(556):20–23. https://doi.org/10.1016/j.actpha.2016.03.005.
31. Senjam SS, Manna S, Bascaran C. Smartphones-based assistive technology: accessibility features and apps for people with visual impairment, and its usage, challenges, and usability testing. *Clin Optom.* 2021;13:311–322. https://doi.org/10.2147/OPTO.S336361.
32. Kamimura T, Ishiwata R, Inoue T. Medication reminder device for the elderly patients with mild cognitive impairment. *Am J Alzheimers Dis Dementias.* 2012;27(4):238–242. https://doi.org/10.1177/1533317512450066.
33. Colenbrander A. Assessment of functional vision and its rehabilitation. *Acta Ophtamol.* 2010;88(2):163–173. https://doi.org/10.1111/j.1755-3768.2009.01670.x.
34. Al-Razgan M, Almoaiqel S, Alrajhi N, et al. A systematic literature review on the usability of mobile applications for visually impaired users. *Peer J Comput Sci.* 2021;7, e771. https://doi.org/10.7717/peerj-cs.771.
35. Khan A, Khusro S. An insight into smartphone-based assistive solutions for visually impaired and blind people: issues, challenges, and opportunities. *Univ Access Inf Soc.* 2021;20(2):265–298. https://doi.org/10.1007/s10209-020-00733-8.
36. Drummond SR, Drummond RS, Dutton GN. Visual acuity and the ability of the visually impaired to read medication instructions. *Br J Ophthalmol.* 2004;88(12):1541–1542. https://doi.org/10.1136/bjo.2003.029918.
37. Karazivan P, Dumez V, Flora L, et al. The patient-as-partner approach in health care: a conceptual framework for a necessary transition. *Acad Med.* 2015;90(4):437–441. https://doi.org/10.1097/ACM.0000000000000603.