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### From barrier to bridge

*Digital decision support to overcome language barriers and enhance communication outcomes with migrant patients*

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### Publication date

2026

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### Citation for published version (APA):

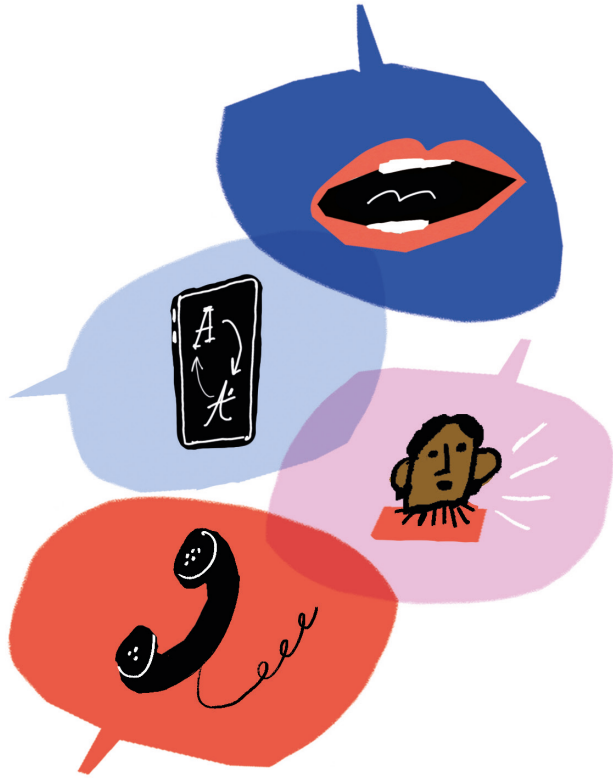
Chan, M. C. (2026). *From barrier to bridge: Digital decision support to overcome language barriers and enhance communication outcomes with migrant patients*. [Thesis, fully internal, Universiteitsbibliotheek].

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# 4.

## Systematic development of a digital decision aid to mitigate language barriers in doctor–patient interactions: A needs assessment study

An adapted version of this chapter has been published as: Chan, B. M. C., van Weert, J. C. M., Fang, Y., Song, J., Suurmond, J., & Schouten, B. C. (2025). Identifying needs for a decision aid to support communication with low-language-proficient migrant patients. *Patient Education and Counseling*, 141, 109307. <https://doi.org/10.1016/j.pec.2025.109307>

## Abstract

**Objectives:** To conduct a needs assessment for developing a digital decision aid that may assist healthcare providers and migrant patients in selecting appropriate communication strategies (e.g., professional phone interpreters and digital translation tools) to mitigate language barriers in language-discordant consultations.

**Methods:** Using the *Extended Technology Acceptance Model* as a guiding framework, we conducted 78 semi-structured interviews with healthcare providers of various disciplines and a heterogeneous ethnic sample of migrant patients and informal caregivers. Using ATLAS.ti, we analysed the data using thematic analysis and the constant comparative method.

**Results:** Six key themes emerged from all interviews, with no fundamental differences between the three groups. Three key themes emerged concerning the perceived usefulness of the digital decision aid's content: 1) Supporting pre-consultation preparation, 2) Assisting the consultation process, and 3) Offering ongoing support post-consultation. Additionally, three key themes emerged concerning the perceived ease of use of the digital decision aid's format: 1) Offering multilingual options, 2) Presenting clear multimedia information, and 3) Ensuring a user-friendly format.

**Conclusion:** To facilitate the adoption of the digital decision aid in practice, it should be available in multiple languages and in a user-friendly format. Additionally, it must support healthcare communication throughout the consultation process.

**Practical Implications:** Implementing a digital decision aid to improve the decision-making process regarding language barriers could bridge communication gaps, enhance the effectiveness and inclusivity of healthcare delivery, and ultimately improve patient outcomes by ensuring that all individuals have equal access to clear and informed medical information and decisions.

## Introduction

The number of international migrants residing in Europe increased from 75 million in 2015 to 87 million in 2020 (World Migration Report, 2024), resulting in super-diverse populations (Vertovec, 2007). When healthcare providers (HCPs) encounter migrant patients who do not speak the host countries' main language fluently, this creates language discordance and significant communication challenges in consultations (Cox & Maryns, 2021; Lopez Vera et al., 2023; Martinez & Leland, 2015). Owing to language barriers, migrant patients in language-discordant consultations (LDCs) often face reduced satisfaction and greater health inequities due to compromised healthcare quality (Al Shamsi et al., 2020; Quiroz et al., 2024; Suurmond & Schouten, 2025). Consequently, language barriers adversely affect their health outcomes (Birkelund et al., 2024; Pandey et al., 2021).

Although migrant patients face greater health inequalities compared to native-speaking patients (Chauhan et al., 2020; Diamond et al., 2019), HCPs often underutilise communication strategies (e.g., professional interpreters) to mitigate language barriers (Chan et al., 2024). Citing practical and organisational barriers, e.g., time constraints, technological limitations, and lack of professional interpreters for languages of rarer diffusion, HCPs frequently fail to incorporate digital translation tools and typically engage professional interpreters only as a last resort (Schouten et al., 2020; Vange et al., 2024). Rather than employing appropriate communication strategies, HCPs often diffuse the responsibility for addressing language barriers onto patients' family members (i.e., informal caregivers) to act as informal interpreters (Schinkel et al., 2019; Zendedel et al., 2018b). When migrant patients are alone during LDCs, HCPs tend to either ask migrant patients to bring an informal caregiver, involve ad-hoc interpreters (i.e., bilingual medical staff acting as interpreters) or adopt the 'getting-by' approach (Chan et al., 2024; Diamond et al., 2009; Würth et al., 2018). However, without the use of appropriate communication strategies, communication in LDCs may become ineffective, further exacerbating the challenges in providing quality care.

Professional interpreters and digital translation tools can alleviate language barriers and improve communication efficiency, thereby facilitating effective communication (Brewster et al., 2024; Karliner et al., 2007; Panayiotou et al., 2020; Turner et al., 2019). Each strategy has its own risks and benefits, though. For instance, while professional in-person interpreters can enhance patient satisfaction, they may not be the most suitable choice for brief consultations due to lengthened consultation times, leading to insufficient information provision (Brown et al., 2023; Butow et al., 2011).

Although digital translation tools are readily accessible, not all types of tools (e.g., fixed phrases versus free-hand) provide the same level of accuracy in translation, and many fail to capture the nuances in complex medical consultations (Kiblinger et al., 2024; Panayiotou et al., 2020; Turner et al., 2019). Treating them as fully accurate may result in negative health consequences (Guerberof-Arenas & Moorkens, 2023). Given the uniqueness of each communication strategy, factors such as the degree of the language barrier encountered, the nature of the medical information (e.g., simple versus complex), and the unpredictability of when professional interpreters are necessary or when digital translation tools suffice in an LDC should be considered in the selection of these strategies (Venkatesan et al., 2022). By personalising the strategies employed for each migrant patient, HCPs can acknowledge the individual behind the patient, safeguard patients' rights to information and ensure that person-centred care is extended to the migrant patient population (Ahmed et al., 2022; Ekman et al., 2021; Gyllensten et al., 2025).

Improving the shared decision-making (SDM) process between HCPs and migrant patients in choosing effective communication strategies is key to facilitating person-centred care (Ahmed et al., 2022; Bodegård et al., 2022). Traditionally, SDM is a collaborative approach that involves clarifying decisions, discussing options, exploring patient preferences, and reaching conclusions about treatment-related concerns (Bomhof-Roordink et al., 2019; Elwyn et al., 2012; Van der Horst et al., 2023). Decision aids are often developed to support SDM in complex medical conditions (Conditions, 1999). Unlike paternalism, person-centred care emphasises the individual patient and delves into what they value to enhance their rights, aiming to enhance a patient's rights to self-determination and autonomy (Gill et al., 2019; Tonelli & Sullivan, 2019). However, if HCPs and migrant patients cannot effectively overcome language barriers, meaningful SDM in LDCs will not be attainable, and person-centred care will not be realised either. Therefore, effectively addressing language barriers is of great importance. Given the promising effectiveness of digital health interventions (World Health Organisation Regional Office for the Eastern Mediterranean, n.d.), one proposed solution to assist HCPs and migrant patients in addressing language discordance is to develop a digital decision aid that facilitates their engagement in SDM regarding the selection of communication strategies for overcoming language barriers.

By adopting the concept of decision aids developed for health conditions, we aim to develop a digital decision aid that will enhance HCPs' and migrant patients' awareness and the SDM process in employing appropriate communication strategies in LDCs. It will provide a comprehensive overview of all communication strategies

available (Chan et al., 2024), outline each strategy's associated risks and benefits, and provide recommendations on strategy usage. However, the specific needs and preferences of HCPs and migrant patients regarding how such content—the information made available on the digital decision aid—and its format—namely, the presentation of the content—remain unknown. To ensure that the digital decision aid is an effective eHealth intervention tailored to HCPs and migrant patients, this study employs the *Extended Technology Acceptance Model* (Chung et al., 2010) as a guiding framework to explore their needs and preferences. Key factors, namely ease of use and perceived usefulness, are central to the model, enhance user satisfaction, promote adherence to usage, and ultimately maximise the digital decision aid's potential for adoption (Madanian et al., 2023; Wosny et al., 2023). Our research question is, therefore, as follows:

*What are the needs and preferences of healthcare providers and migrant patients, regarding the content and format of a digital decision aid aimed at supporting shared decision-making about the communication strategies to use for overcoming language barriers in language-discordant consultations?*

Developing such a digital decision aid will enable HCPs to systematically overcome language barriers in LDCs. This will prevent them from viewing these challenges as mere technical tasks and alleviate migrant patients' feelings of frustration and indirect discrimination stemming from perceived differences in treatment (Suurmond et al., 2011). Similarly, migrant patients can benefit from the digital decision aid to better understand their rights to access professional interpreting services and information and navigate language barriers when using the host country's healthcare system.

## Methods

### Study Context and Consent

This study is part of the *Right2Health*<sup>4</sup> project, that aims to develop and evaluate an evidence-based digital decision aid for healthcare providers (HCPs) and migrant patients to use in language-discordant consultations (LDCs). We employed a qualitative study design and conducted semi-structured interviews with a heterogeneous sample of Dutch HCPs, migrant patients and patients' informal caregivers.

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4 *Right2Health* constitutes the University of Amsterdam, Radboud University Medical Centres, KU Leuven, Utrecht University, and the University of Ghent.

The Amsterdam School of Communication Research (ASCoR) (2022-PC-14489) and the board of the Medical Ethical Committee of the Amsterdam UMC; location AMC; Amsterdam (W22\_032 # 22.062) approved this study.

### **Recruitment**

Purposive and snowball sampling were used to generate a heterogeneous sample of HCPs, migrant patients, and informal caregivers. We included informal caregivers because their experiences accompanying migrant patients as informal interpreters can offer valuable insights. Researchers (BC, JW, JS, BS) and eight trained interviewers representing the migrant communities in the Netherlands contacted their own networks via email or phone to facilitate recruitment. Interested participants were sent information letters, informed consent forms in participants' native languages (e.g., Dutch, Turkish, or Chinese), and gift card registration forms. All participants provided written- and audio-informed consent.

### **Participants**

The inclusion criteria for HCPs were: (1) aged eighteen and above, (2) employed in the Netherlands and (3) actively treating migrant patients at least twice monthly (for rationale, see (Chan et al., 2024).

The inclusion criteria for migrant patients were: (1) aged eighteen and above, (2) living in the Netherlands, (3) having low self-reported language proficiency in Dutch and English, and (4) having used the Dutch healthcare system in the past year.

The inclusion criteria for informal caregivers were: (1) aged eighteen and above, (2) living in the Netherlands, (3) having assisted at least one patient using the Dutch healthcare system in the past year with interpreting during medical consultations. migrant patients and informal caregivers interviewed were not related to each other.

Tables and Figures 1 and 2 show an overview of our interviewees' background characteristics.

**Table 1***Background Characteristics of Healthcare Providers (N = 27)*

Characteristics	<i>n</i>	% or mean
Gender		
Female	15	55.56
Male	12	44.44
Age (mean)		45.07 (SD = 11.46)
Religion		
Catholicism/Christianity	4	14.81
Judaism	1	3.70
Islam	2	7.41
None/Prefer not to say	20	74.07
Country of birth		
Netherlands	24	88.89
Other	3	11.11
Specialisation		
General practitioner	7	25.93
Specialist	13	48.15
Nurse	3	11.11
Mental health provider	4	14.81
Years in current practice		
0 – 5	5	18.52
6 – 10	6	22.22
11 – 15	5	18.52
16 – 20	3	11.11
21 +	8	28.57

**Table 2***Background Characteristics of Migrant Patients and Informal Caregivers (N = 51)*

Characteristic	Migrant patients	Informal caregivers
	( <i>n</i> = 25)	( <i>n</i> = 26)
Gender		
Female	19 (76.00%)	19 (73.08%)
Male	6 (24.00%)	7 (26.92%)
Age (SD)	50.28 (17.23)	35.95 (13.51)
Residence time in the Netherlands		
Born in the Netherlands	0 (0.00%)	15 (57.69%)
Mean residence time in years (SD)	19.92 (11.31)	26.27 (14.53)

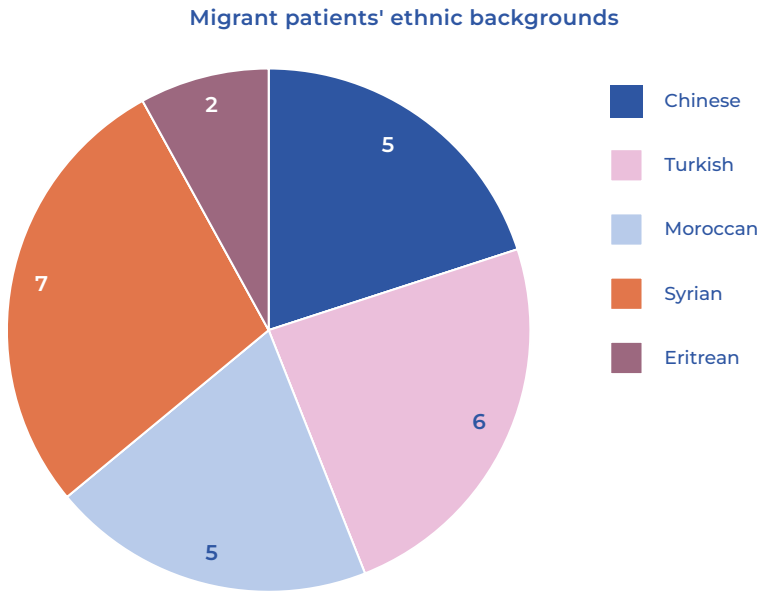
**Table 2** (continued)

Characteristic	Migrant patients	Informal caregivers
	(n = 25)	(n = 26)
Highest education level		
No education	6 (24.00%)	0 (0.00%)
Preliminary school	4 (16.00%)	0 (0.00%)
High school	8 (32.00%)	1 (3.85%)
Intermediate vocational education	1 (4.00%)	5 (19.23%)
Higher professional education	1 (4.00%)	3 (11.54%)
Academic education	2 (8.00%)	14 (53.85%)
Not disclosed	3 (12.00%)	3 (11.54%)
Employment status		
Employed	11 (44.00%)	19 (73.08%)
Unemployed	13 (52.00%)	4 (15.38%)
Student	1 (4.00%)	2 (7.69%)
Retired	0 (0.00%)	1 (3.85%)
Religion		
Catholicism/Christianity	1 (4.00%)	4 (15.38%)
Islam	19 (76.00%)	11 (42.31%)
Buddhism	1 (4.00%)	1 (3.85%)
None/prefer not to say	4 (16.00%)	10 (38.46%)
Household size (including participant)		
1 (Live alone)	3 (12.00%)	6 (23.08%)
2 – 3	5 (20.00%)	10 (38.46%)
4 – 5	12 (48.00%)	10 (38.46%)
Above 5	5 (20.00%)	0 (0.00%)
Relationship with informal caregivers/ patients <sup>5</sup>		
Spouse	3 (12.00%)	3 (11.54%)
Siblings	1 (4.00%)	1 (3.85%)
Child(ren)	5 (20.00%)	1 (3.85%)
Parent(s)	1 (4.00%)	20 (76.92%)
Friends	0 (0.00%)	1 (3.85%)
Others	0 (0.00%)	1 (3.85%)
No informal caregivers available	16 (64.00%)	/

5 Informal caregivers may not add up to  $n = 26$  as one informal caregiver may take care of multiple patients.

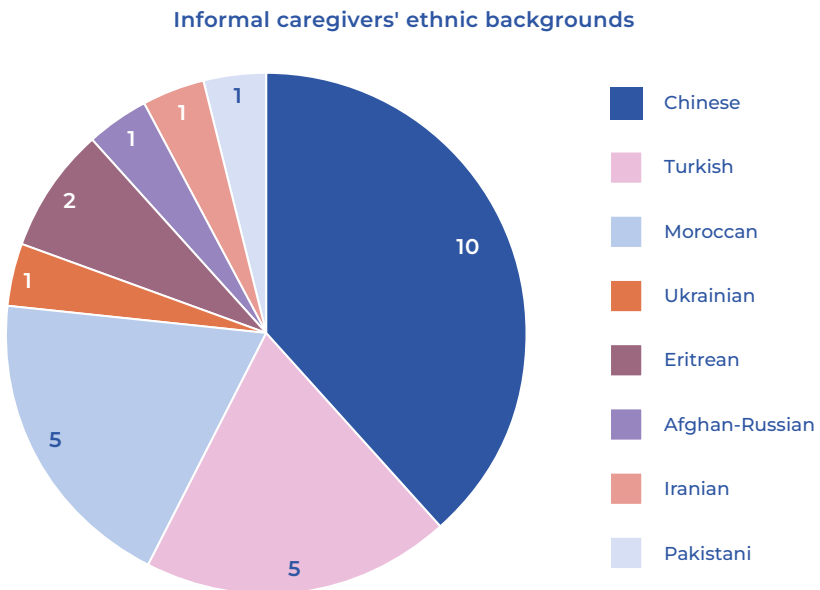
**Figure 1**

Overview of Migrant Patients' Ethnic Backgrounds (n = 25)



**Figure 2**

Overview of Informal Caregivers' Ethnic Backgrounds (n = 26)



## Data Collection

Data collection took place from February 2022 to August 2023. Interviews were conducted by the first author (BC) and eight trained interviewers in the interviewees' preferred language: English ( $n = 31$ ), Dutch ( $n = 16$ ), Moroccan Arabic ( $n = 5$ ), Turkish ( $n = 9$ ), Mandarin ( $n = 6$ ), Tigrinya ( $n = 4$ ), and Syrian Arabic ( $n = 7$ ). All interviews ( $n = 78$ ) were audiotaped, transcribed verbatim and translated into English before analysis. All interviewers had previous experience with qualitative research and received training from BC to ensure reliability. On average, the interviews lasted an hour.

The current study's topic guides (see Appendix B for examples) were developed using the *Extended Technology Acceptance Model* (Chung et al., 2010) and revised after discussions with the *Right2Health* consortium.

## Data Analysis

To embrace the emphasis on acknowledging super-diversity, which underscores the need to examine individuals' experiences beyond traditional group-based categorisation—such as ethnicity—and consider them from more multidimensional perspectives by accounting for the intersection of other variables, e.g., socioeconomic status, we intentionally analysed our dataset as a superset (Schouten et al., 2023; Vertovec, 2007).

Using ATLAS.ti version 22.0.2, the principal researcher (BC) and two trained research assistants (YF, JS) analysed 78 interview transcripts. *Thematic Analysis* (Braun & Clarke, 2021) and the *Constant Comparative Method* (Charmaz, 2014) were employed to generate key and sub-themes.

The data were analysed deductively according to the topic guide and inductively by developing new codes that emerged. We initially adopted the *Descriptive Coding* technique (Saldaña, 2009). The coding process comprised three stages. First, the principal researcher independently coded ten transcripts to develop a preliminary codebook. Second, another trained coder, who had no prior knowledge of the project, coded six transcripts alongside the principal researcher. Through peer debriefing, the preliminary codebook was further modified to enhance the reliability and applicability of the existing codes. All transcripts were coded independently according to the refined codebook in the final stage, where we employed the principle of *Pattern Coding* (Saldaña, 2009) to organise codes, enabling us to identify more meaningful and parsimonious patterns in the data. This means that our coding process did not follow a linear sequence; instead, we continuously compared our initial descriptive codes with pattern codes to construct a more reliable and generalisable coding system.

## Results

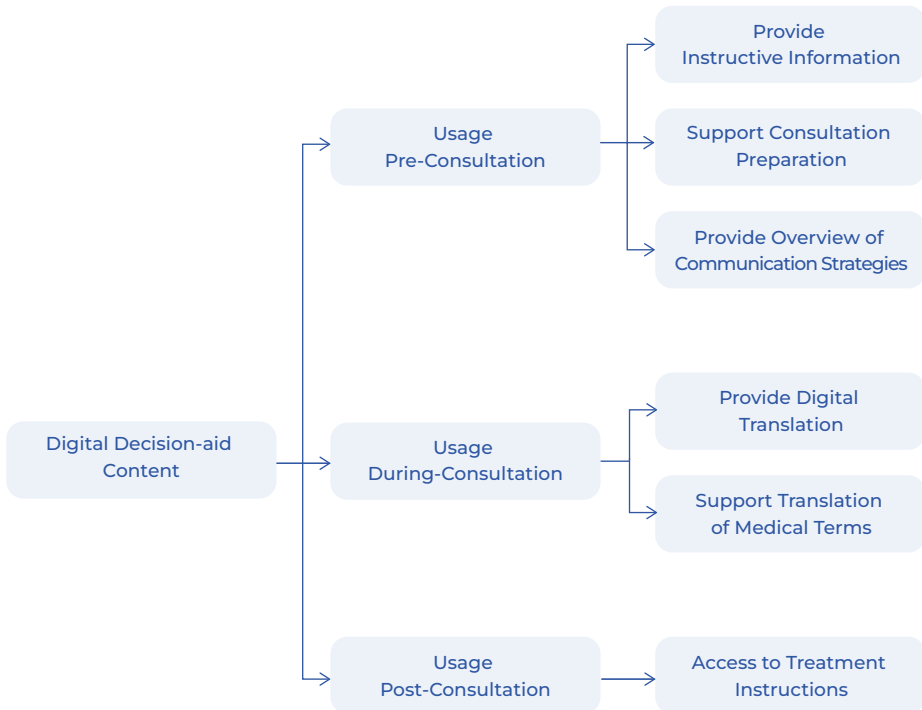
Six key common themes emerged from all the interviews. There were no fundamental differences among the three groups regarding their needs and preferences; however, there were variations in their knowledge of the different interpreter options. The themes related to features that could enhance the digital decision aid's perceived usefulness of the content and the perceived ease of use of the format will be reported separately.

### Perceived Usefulness of the Digital Decision Aid's Content

According to the interviewees, three key themes that could enhance the perceived usefulness of the digital decision aid's content are ensuring that the content supports each phase of consultation: 1) Supporting pre-consultation preparation, 2) Assisting the consultation process, and 3) Offering ongoing support post-consultation (see Figure 3 for an overview). Table 3 offers an overview of additional quotations concerning interviewees' perceived usefulness of the digital decision aid's content.

**Figure 3**

*Concept Indicator Model of the Digital Decision Aid's Content*



### **Supporting Consultation Preparation**

Almost all migrant patients and informal caregivers mentioned hoping that the digital decision aid can be used in preparation for consultations to inform HCPs of their language needs:

*“[It’s best to use the digital decision aid] before the consultation because they can think well about their [language] problems at home.” (Male, 43, Eritrean, Informal caregiver)*

To facilitate the preparation, migrant patients reported willingness to provide information about their Dutch language proficiency, preference for the type of interpreters, their family members’ contacts and privacy concerns in the digital decision aid. Providing such information could improve the logistics of arranging (professional) interpreters or incorporating digital translation tools in LDCs. Some migrant patients and informal caregivers indicated that one efficient way of transmitting such information is to allow patients to create profiles visible to HCPs on the digital decision aid.

**Provide an Overview of Translation Options.** Almost all migrant patients and informal caregivers were unaware that professional interpreting services were available upon request. On the other hand, most HCPs were aware of the professional interpreting services they could turn to. This shows a clear information asymmetry between HCPs and migrant patients. To facilitate the accessibility of the strategies, migrant patients, informal caregivers, and HCPs have identified the need to display all communication strategies (i.e., interpreting options) in the digital decision aid:

*“Maybe [explain] what exactly is a professional interpreter? What are the main benefits? How do you apply for it?” (Female, 25, Turkish, Informal caregiver)*

Moreover, some HCPs favour the digital decision aid to offer comprehensive and up-to-date information regarding the professional interpreting services accessible at the municipal level, considering the differences in the availability of professional interpreters across municipalities. This will make professional interpreters more accessible:

*"I think [it should have information] that keeps you updated in resources for language aids [interpreters] that exists in the Netherlands." (Female, 63, General Practitioner)*

**Provide Instructive Information.** Most migrant patients, informal caregivers and HCPs mentioned the need for instructive information on the digital decision aid. Many stressed the need for a step-by-step guide to help migrant patients understand how it can be used:

*"You know, [sometimes] you [get] explanation papers with step one, step two with picture[s], [explaining] what you can do, [what] to look in. Just the general process [of usage] description." (Male, 28, Chinese, Informal caregiver)*

Many HCPs indicated that the importance of properly mitigating language barriers in healthcare settings should also be mentioned. From their perspectives, migrant patients and informal caregivers often underestimate the complexity of information exchange with a language barrier. To raise migrant patients' and informal caregivers' awareness of this, part of the instructions for using the digital decision aid should thus mention this:

*"Maybe something about [how] language is important, and how we communicate, [like being able to explain your complaints to the doctor] is [different to] doing groceries." (Female, 54, Internist)*

### **Assisting the Consultation Process**

**Provide a Reliable Digital Translation Tool.** Although migrant patients and informal caregivers emphasised the need for an overview of all digital translation tools available, they recognised that the current tools, such as Google Translate, are not always accurate. Few informal caregivers explicitly voiced their doubts regarding the tools' abilities to translate complex medical terminologies. Despite this limitation of digital translation tools, migrant patients still expressed a preference for them, as they facilitate independent communication between themselves and HCPs. One migrant patient noted that digital translation tools can be particularly beneficial for individuals facing 'embarrassing' medical issues, especially when they must rely on their informal caregivers due to a lack of access to professional interpreters. Furthermore, some indicated that they preferred direct communication with HCPs, either using digital translation tools or professional interpreters, owing

to a combination of privacy concerns, emotional challenges, and the fear of being a burden to their family members:

*“If an instrument is developed [to help me choose communication strategies], I can [see a doctor] without my husband [present] in case of special complaints that I do not want my husband to hear.” (Female, 64, Turkish, Patient)*

As a potential solution, migrant patients and informal caregivers thus expressed that the digital decision aid can perhaps provide an in-built, reliable digital translation tool:

*“If you have something [on the digital decision aid] that really translates very accurately, specifically for that part, then I think that would already help my parents a lot.” (Chinese, Female, 27, Informal caregiver)*

### **Offering Continuous Support Post-Consultation**

Many migrant patients reported experiencing missing information post-consultation and needing informal caregivers’ help to understand their diagnoses or treatment plans after consultations. Few also mentioned receiving Dutch written materials, which were not useful as they could not read them. As a result, migrant patients said they would like the digital decision aid to have a feature that can allow them to store medical information provided by HCPs. It would be handy as they can directly translate the information using their phones. If possible, they would also like a function allowing them to ask for clarifications from HCPs post-consultation.

**Table 3**

*Quotations Illustrating Interviewees’ Needs and Preferences in Relation to the Perceived Usefulness of the Digital Decision Aid’s Content*

Themes	Quotations
Supporting consultation preparation	<p><i>“Before the consultation, so the doctor would know about my [problems] before the consultation, in order not to lose time.” (Syrian, Female, 45, Patient)</i></p> <p><i>“I think it would help to do it [use the digital decision aid] before the consultation so that they have an idea of what’s expected and what they can ask [for, in terms of translation methods] and [then] have a clearer idea.” (Pakistani, Female, 29, Informal caregiver)</i></p> <p><i>“I would like to use the digital decision aid] before the consultation, because I would like to go to the GP with enough [preparation].” (Eritrean, Male, 43, Informal caregiver)</i></p>

**Table 3** (continued)

Themes	Quotations
	<p><i>"It might be useful to indicate in advance that you are coming to translate and that you want to double the time in case of important problems. (Turkish, Female, 53, Informal caregiver)</i></p> <p><i>"I would tell him [it] [the digital decision aid] my preferred language and my level of Dutch and English proficiency to ensure smooth communication. (Syrian, Female, 22, Patient)</i></p> <p><i>"I think it's better to prepare [think about the language barriers and indicate preferences] at home. (Chinese, Female, 25, Patient)</i></p> <p><i>"I would like him [it] [the digital decision aid] to know my medical history, and if I need a translator before the consultation. (Syrian, Male, 50, Patient)</i></p> <p><i>"It would be great if I could ask for a translator [before the consultation] through this tool. (Syrian, Female, 39, Patient)</i></p>
Provide an overview of translation options	<p><i>"There are general [translation] options, but then you have to see for what can I specify that into local possibilities? That's well specifically here in Amsterdam or in the Netherlands we have interpreters by phone." (Male, 49, Internist)</i></p> <p><i>"Um, maybe the concept [of the digital decision aid] would be like [providing information about] what exactly is a professional interpreter? Like, what are the main benefits? [...] How do you apply for it?" (Turkish, Female, 25, Informal caregiver)</i></p> <p><i>"I think definitely [provide an overview of translation options], because I never even knew there was an option for an interpreter until right now. So..." (Iranian, Female, 25, Informal caregiver)</i></p>
Provide an overview of translation options	<p><i>"I think a model could be like a device that keeps you updated in resources for language aids that exists in the Netherlands." (Female, 63, General practitioner)</i></p> <p><i>"The (communication) methods (for example professional interpreters) that the patients can use to understand the information. Health is very important, and an interpreter is needed if you are very sick." (Eritrean, Male, 43, Informal caregiver)</i></p>
Provide instructive information	<p><i>"Yeah, maybe like, a guide on what to find, where and how to get certain information." (Pakistani, Female, 29, Informal caregiver)</i></p> <p><i>"[Provide]some guidance on like, using this app or tool?" (Iranian, Female, 25, Informal caregiver)</i></p>

**Table 3** (continued)

Themes	Quotations
Provide instructive information (continued)	<p data-bbox="452 323 1057 465">“Yeah, I think for sure. If there’s like any introduction guide, or like instructions, you know, and maybe just a little bit of background information on like, hey, how can you use this app like... Kind of maybe a step by step” (Chinese, Female, 27, Informal caregiver)</p> <p data-bbox="452 487 1057 629">“Well, an explanation, why it’s the reason for the tool? And then maybe something about that language is important, and how do we communicate that doing groceries is something else than being able to explain your complaints to the doctor... something like that.” (Male, 54, Internist)</p> <p data-bbox="452 651 1057 760">“I think so. And I think it will be handy, maybe nice to have maybe instruction video, because that’s easier to go through than five pages of text explaining how to do it.” (Chinese, Male, 29, Informal caregiver)</p>
Assisting the consultation process	
Provide a reliable digital translation tool	<p data-bbox="452 846 1057 933">“Technology moves on, so that could be it... [Digital translation] That I say something, and it is translated digitally. That can be useful.” (Turkish, Female, 64, Patient)</p> <p data-bbox="452 955 1057 1152">“But you know the hard part is like with Asian people, we are very keen on privacy. Like, a subject like sex or something, you will not talk about with your parents. So maybe if he, for example, it won’t happen, but maybe my dad gets a STD, you know? ..... Maybe a translation app is like something that they will feel confident to use and then they will feel like the privacy is kept.” (Chinese, Female, 29, Patient)</p>
Provide an overview of translation options	<p data-bbox="452 1183 1057 1324">“I think just something that translates more accurately, I guess, because sometimes I would just, like, keep Google Translate with me, you know, during the appointment or something. But, you know, sometimes that’s also not 100% accurate, right?” (Chinese, Female, 27, Informal caregiver)</p> <p data-bbox="452 1346 1057 1516">“You know, it’s also like how oh well in the dialect like. I think that’s going to be a lot of work if you had to for every language and dialect, but... address it in and then translator can order an artificial intelligence, I don’t know, can translate the voice message into oral language so my mom can understand.” (Chinese, Male, 29, Patient)</p>

**Table 3** (continued)

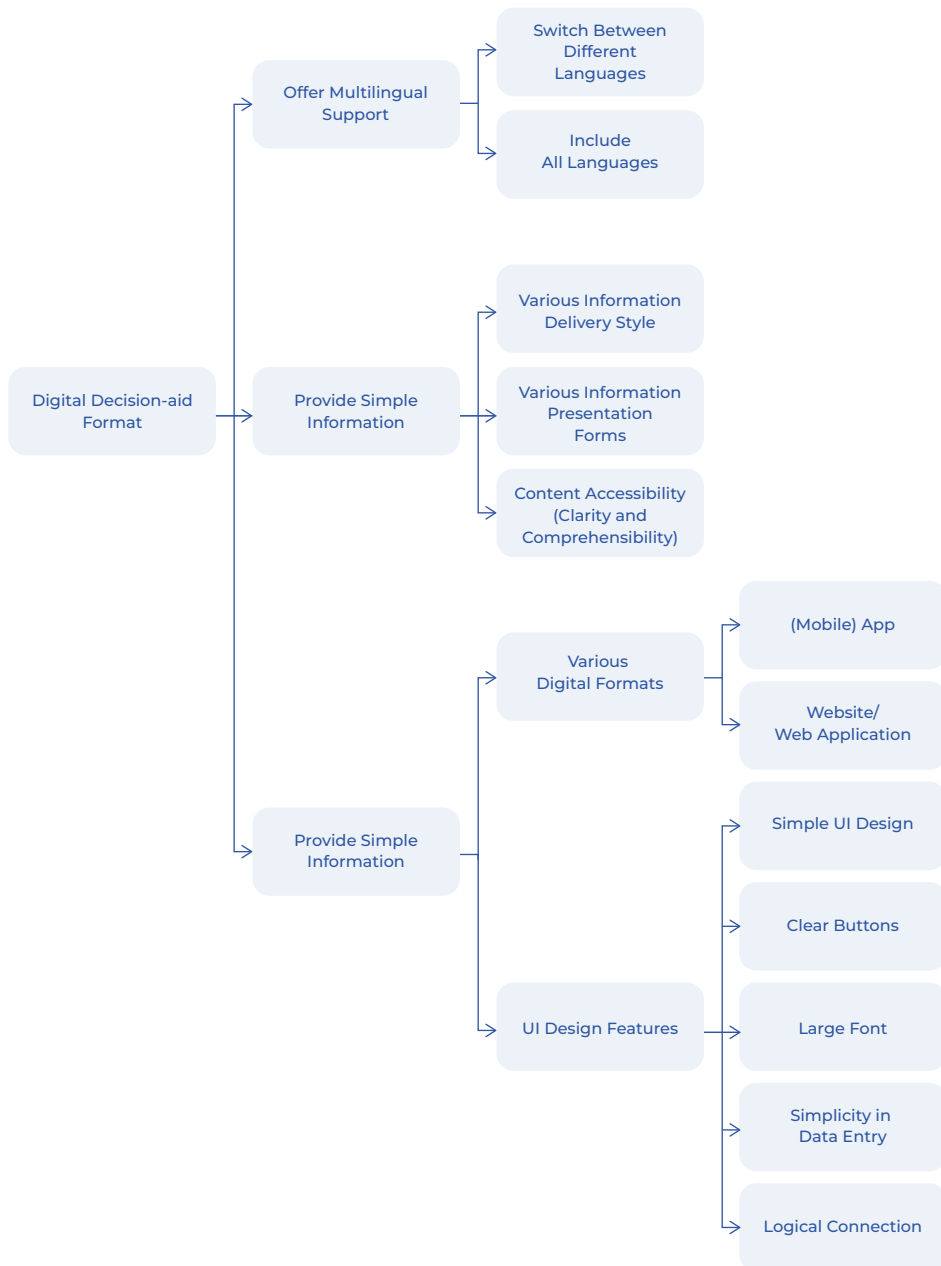
Themes	Quotations
Provide an overview of translation options (continued)	<p><i>"I prepare all my health problems/information, and I write it on paper. I tried using google translate but failed. Because google translate doesn't give a good translation." (Eritrean, Male, 43, Patient)</i></p> <p><i>"I would prefer to use a translation tool that is in Arabic and that the doctor can also use in his native language. This would ensure that the translation is accurate and that we can communicate effectively." (Syrian, Female, 22, Patient)</i></p>
Offering continuous support post-consultation	
<p><i>"Telling you about your medical condition in Chinese, explaining the medications you might need, and how the condition might progress in the future." (Chinese, Female, 33, Patient)</i></p> <p><i>"Each time I collect medication; there's a label on the medication that tells you how to use it. I think it [the digital decision aid] would be helpful if they could provide a translated version of that label." (Chinese, Female, 25, Patient)</i></p> <p><i>"Maybe after the first consultation, [there can be a space to look at the information discussed] again and see [...] what else do we need?" (Iranian, Female, 25, Informal caregiver)</i></p> <p><i>"After the GP visit, the GP can send the [information about the] illness to, like the app [digital decision aid] or something." (Afghan-Russian, Male, 28, Informal caregiver)</i></p> <p><i>"Telling you about your medical condition in Chinese (after consultations), explaining the medications you might need, and how the condition might progress in the future." (Chinese, Female, 33, Patient)</i></p> <p><i>"And then you get prescribed the medicine, then it also gives you instructions of the medicine." (Chinese, Male, 27, Informal caregiver)</i></p>	

### Perceived Ease of Use of the Digital Decision Aid's Format

The three main recommendations from interviewees regarding the digital decision aid's perceived ease of use in relation to its format were: (1) Providing multilingual options, (2) Presenting clear multimedia information, and (3) Ensuring a user-friendly format (see Figure 4 for an overview). Table 4 offers an overview of additional quotations.

**Figure 4**

*Concept Indicator Model of the Digital Decision Aid's Format*



### **Providing Multilingual Options**

HCPs said the digital decision aid should be available in users' native languages to facilitate ease of use. While an ideal system would support seamless language switching of all kinds of languages, HCPs pragmatically suggest incorporating the five to ten most common languages used by patients and their informal caregivers in the Netherlands:

*"It's an ideal situation if you can have it [the digital decision aid] for all languages, but if you know, for example, [you inspect] the population here [and need to choose], I will say ask which languages are the most common? Probably Arabic, Turkish, Polish." (Male, 33, Internist)*

### **Presenting Clear Multimedia Information**

When it comes to presenting information, various style preferences have emerged, with the commonality among them being the necessity for clarity. This can be accomplished by delivering the information simply, ensuring easy comprehension and preventing information overload. Nearly all interviewees suggested presenting the digital decision aid as a questionnaire or an infographic to allow for easy information processing:

*"Yeah, maybe like, a guide on what to find, where and how to get certain information. Or maybe just like... Infographics, things like that." (Female, 29, Pakistani, Informal caregiver)*

Most interviewees also noted that offering the digital decision aid in multimedia format is important, to cater to patients with low health literacy and digital literacy. They thought offering video or audio content could ensure that the aid is as inclusive as possible.

### **Ensuring a User-friendly Format**

Although patients, informal caregivers, and HCPs preferred the decision aid to be available in various digital formats (e.g., as a mobile application), websites were regarded as the easiest to use. Migrant patients and informal caregivers stressed that the interface should be simple, user-friendly, and intuitive to promote ease of use and increase accessibility. HCPs and informal caregivers also noted that the content should be displayed in a large format (e.g., with large fonts and buttons), and that textual information could potentially be accessed via drop-down menus

to prevent information overload. This approach would help older adults with limited digital literacy to also use it:

*“Make it user-friendly. Don’t make it complicated for the people that are using it, especially when it’s older people, they can get overwhelmed by technology really fast.” (Male, 27, Chinese, Informal caregiver)*

**Table 4**

*Quotations Illustrating Interviewees’ Needs and Preferences in Relation to the Perceived Ease of Use of the Digital Decision Aid’s Format*

Themes	Quotations
Providing multilingual options	<p><i>“And of course, language plays huge role in this, if you can make a different language versions of the application will be better, then they can usually just look at it themselves, and then take their time.” (Chinese, Male, 27, Informal caregiver)</i></p> <p><i>“It would be great if there was an option to use the desired language so that the patient can understand how to use it.” (Syrian, Male, 50, Patient)</i></p> <p><i>“Yeah, I think specifically, for my parents, for example, like just Chinese would be nice, traditional [or] simplified Chinese. I don’t think they would use [it] [if it was in] Dutch, to be honest. [Multilingual option] would be a nice feature. I think that would be nicer for, for example, for me, to have that Dutch feature, because then we can also like, help our parents at the same time. If they’re in the app, and we can also guide them or see like, Oh, this is what it says, or something. And then tell our parents like, Okay, this is how you use it. So yeah, different language options would definitely be very helpful.” (Chinese, Female, 27, Informal caregiver)</i></p> <p><i>“For informal caregivers, it doesn’t matter which language because we will read anything, we will understand anything. But the tool itself, if it’s for people who are we are translating for, it should be like in a lot of languages.” (Chinese, Female, 26, Informal caregiver)</i></p>
Presenting clear multimedia information	<p><i>“I think it [should] be customisable. Some people prefer text, while others prefer videos. You can just let users choose for themselves.” (Chinese, Female, 25, Patient)</i></p> <p><i>“It would be great to have everything written clearly on a piece of paper. It’s easier to understand. You don’t have to rely on your memory. For someone of my age, reading text is more convenient.” (Chinese, Female, 53, Patient)</i></p>

Table 4 (continued)

Themes	Quotations
Presenting clear multimedia information (continued)	<p><i>"I think videos would be better because they can show you more. Text only conveys information through words, and you have to interpret it yourself. With videos, they can explain everything to you, and you can understand everything they're trying to convey." (Chinese, Female, 33, Patient)</i></p> <p><i>"I would like it to have images if they provide additional information, but if they are redundant, I would prefer it without them. Videos in my language would be helpful." (Syrian, Female, 45, Patient)</i></p> <p><i>"Because she can't speak Dutch. So I think seeing it on video is important. But like I said you can see a lot. But schizophrenia is a difficult disease and there are many different kinds it is not the same in everyone." (Moroccan, Gender not disclosed, 50, Informal caregiver)</i></p> <p><i>"I think audio [or] video, I think you should have all options because yeah, there's so many people in the world." (Afghan-Russian, Male, 28, Informal caregiver)</i></p> <p><i>"I think for in the case of my mom it should be visual [images] so she can see it." (Chinese, Female, 32, Informal caregiver)</i></p> <p><i>"A digital tool with video animations and graphics are suited for people who cannot read and/or understand Dutch well." (Eritrean, Male, 43, Informal caregiver)</i></p> <p><i>"I think that a lot of people just can't read. I mean, I think that's an underestimated problem, and even if you're dealing with migrants... I think I don't think they can read as well as you might think they can so I would prefer it to be audio also at least." (Male, 33, Internist)</i></p> <p><i>"[It would be nice if] you have multiple options that you can, you know, choose to make a video that they can visualize it. And you can show them with some graphs, with some Chinese text, or just telling, or speak it out. There are many possibilities now." (Chinese, Female, 29, Informal caregiver)</i></p> <p><i>"You kind of have like, questions about different themes. And then based on what you answer, like, there's like certain parties that would suit your preferences the most I guess." (Turkish, Female, 25, Informal caregiver)</i></p>

**Table 4** (continued)

Themes	Quotations
Presenting clear multimedia information (continued)	<p><i>"And maybe also the multiple-choice kind of answers. Because, yeah, if it's like an open question or something like that, then... Sometimes when you see like multiple choice, you see answers that you really didn't think of. But then when you see it, you're like, oh, yeah, I can actually just want that. So I feel like it would be really helpful." (Turkish, Female, 25, Informal caregiver)</i></p> <p><i>"Because they do not really have the strength at that moment, so I would keep it all very simple and very little work." (Male, 50, Mental Healthcare Provider)</i></p> <p><i>"I think videos and images are easier to follow and understand the information, because I can't read well" (Eritrean, Male, 45, Patient)</i></p> <p><i>"Yes, when seeing information or video film or seeing something, yes. That gives me confidence...because you see things yourself and you get a result, then you certainly have confidence...then I understand more." (Moroccan, Female, 45, Patient)</i></p> <p><i>"Yeah, I think for my parents, visuals always really make it more convenient, you know? [...] There's also audio, so then she listen to it, you know? I think it will be very convenient." (Chinese, Female, 27, Informal caregiver)</i></p>
Ensuring a user-friendly format	<p><i>"If it's an easy app with easy functions, then I think they will prefer the app version. But if it has too many functions, many features, then they will just prefer the paper version." (Chinese, Female, 24, Informal caregiver)</i></p> <p><i>"I think it should be an app, something easy to navigate for them. It shouldn't have too much, you know, things that you can click, it should be very simple." (Chinese, Female, 24, Informal caregiver)</i></p> <p><i>"I think an app is maybe too much, because you got to download the whole thing. And a website I think is sufficient." (Iranian, Female, 25, Informal caregiver)</i></p> <p><i>"I think a website [is better] because if you have an app, then you also have to log in, you have to download it, there are additional steps. So, I think a website would be better. It's just one click." (Chinese, Female, 28, Informal caregiver)</i></p>

**Table 4** (continued)

Themes	Quotations
Ensuring a user-friendly format (continued)	<p><i>"Of course, people will have a language barrier, or not too good with digital things. Because they're most mostly older people to think, because if you're younger, you can use the adapt and learn languages. Quicker. And yes, time for perhaps. Well, yeah, I guess for the older, I guess, having both formats (i.e., web format &amp; app format). It's nice. It's nice to have like options."</i> (Chinese, Male, 29, Informal caregiver)</p> <p><i>"Nowadays, it's mostly apps, so an app would be better. You can download it and have your own personal account. As for websites, everyone is using them."</i> (Chinese, Female, 33, Patient)</p> <p><i>"Make sure that the font is not too small because sometimes older people have difficulties with reading."</i> (Chinese, Male, 27, Informal caregiver)</p> <p><i>"The buttons they need to press needs to be clear, like instructions given to the person needs to be clear before anything else. Otherwise, [the] person itself gets confused. And it takes a lot more time [to use]."</i> (Chinese, Male, 27, Informal caregiver)</p>

## Discussion

The needs and preferences of HCPs, migrant patients, and informal caregivers regarding the digital decision aid are largely associated with the language challenges they face in their LDCs. While the perceived usefulness of the digital decision aid's content depends on its capacity to assist LDCs at different consultation stages, the perceived ease of use of its format relates to its multilingual nature, simplicity, and user-friendliness.

Migrant patients have a strong preference for being well-prepared to address anticipated language barriers before a consultation, such as via making a request for professional interpreting services. Although interventions, e.g., Ikram et al., 2015; Schouten et al., 2005, have been developed to raise migrant patients' and HCPs' awareness about the importance of overcoming language barriers properly, our results hint that professional interpreters and digital translation tools may have been underutilised due to information asymmetry (Lopez-Bushnell, 2020). To address this, a feature that lists and explains all communication strategies was suggested as part

of the decision aid. It is believed that such information can ensure migrant patients make informed decisions about the strategies they can use in LDCs.

While several HCPs mentioned being aware of the available communication strategies, selecting the most appropriate one for LDCs remains challenging, especially when informal caregivers are present or when HCPs and migrant patients do not acknowledge the language barrier (Lijbers et al., 2018; Suurmond et al., 2015; Van Rosse et al., 2016). The greatest concern for HCPs—especially in primary care—is the limited consultation time with each patient (Ali & Watson, 2018; Brown et al., 2023). Despite the availability of guidelines for requesting professional interpreters in the Netherlands, HCPs still find arranging them difficult and time-consuming (Ali & Watson, 2018; Suurmond et al., 2015). Providing a pre-consultation decision aid could streamline these processes and enhance communication efficiency by aligning HCPs and migrant patients regarding the extent of the language barrier they face.

Aligned with existing literature (Venkatesan et al., 2022), our study found that collecting information about patients' language proficiency, the complexity of medical situations, and preference for (professional) interpreters' attendance pre-consultation can guide migrant patients and HCPs in making a joint-informed decision about what communication strategy to use in LDCs. To cover these aspects, a questionnaire with simple data entry options (i.e., multiple-choice questions) would be a user-friendly option, as they reduce the time and, subsequently, cognitive load needed to complete it (Vyas & Supe, 2008). During the interviews, some migrant patients and informal caregivers struggled to understand the purpose of a decision aid. Consequently, it was recommended that the digital decision aid include accompanying step-by-step instructions. By providing these instructions before their first use (i.e., instructional scaffolding), target users can learn to use the aid intuitively, thereby establishing a new habit of overcoming language barriers (Shabani et al., 2010).

Finally, while discussing the incorporation of digital translation tools, many HCPs, migrant patients, and informal caregivers reported concerns regarding their translation accuracy—especially with Google Translate for translating complex medical terminology. Nonetheless, most interviewees acknowledged the rapid advancements of current digital translation tools and recognised how they can be utilised in LDCs. Two potential solutions for improving their experiences with digital translation tools would thus be to incorporate a medical dictionary (e.g., fixed-phrase translations like QuickSpeak) and embed more reliable digital translation tools (e.g., translators other than Google Translate) next to the decision aid (Turner et al., 2019). However, it is crucial to remember that these tools' accuracy heavily depends on the

specific language pairs. Additionally, users should be reminded that digital translation tools are less accurate than professional interpreters and be provided with guidelines on the best practices for translating with such tools (Taylor & McLean, 2024).

### **Practical Implications**

Developing a digital decision aid for LDCs can guide HCPs and migrant patients in selecting appropriate communication strategies, ultimately helping to reshape their communicative behaviours during LDCs. HCPs can benefit from such a tool due to reduced stress resulting from poor communication in LDCs (EL Dabbah & Elhadi, 2023). Similarly, migrant patients can benefit from better health outcomes due to reduced language-based inequality caused by HCPs' suboptimal decisions in mitigating language barriers, which is driven by pragmatism or organisational barriers (Cano-Ibáñez et al., 2021; Green & Nze, 2017; Seale et al., 2022). By developing a digital decision aid aimed at migrant patients, it will also empower them to recognise that they do not carry the responsibility of overcoming language barriers. This will lead to more appropriate incorporation of communication strategies for different medical scenarios depending on various factors, ultimately increasing HCPs' competency in managing LDCs.

### **Limitations and Future Research**

This study is not without limitations. First, while we collected rich, in-depth data from 78 interviews with HCPs, migrant patients, and informal caregivers to develop the digital decision aid, we primarily focused on their shared priorities. However, we are aware that some literature (Westerbeek et al., 2021; Wosny et al., 2023) has highlighted other conditions of tools that would increase perceived ease of use, such as seamless integration into the work systems of HCPs. Future research should conduct additional quantitative studies, for instance, using a survey design to cross-verify insights.

Second, although we pilot-tested our topic guides in multiple languages and provided examples of existing digital decision aids, older migrant patients struggled to articulate their needs for the aid, leading to occasional vague responses. Different levels of familiarity with technology likely caused such responses. To tackle this, we continuously adapted our topic guides and interview techniques, such as metaphor-based questioning, to increase patients' understanding (Seung et al., 2015). Future research should consider scenario-based questioning (e.g., using the vignette technique) to align perspectives and avoid communication barriers with interviewees at different levels of digital literacy (Valdez, 2025).

## **Conclusion**

Migrant patients and HCPs emphasised the need for a multilingual, user-friendly digital decision aid to support LDCs across different stages of the consultation process. Implementing an accessible and structured digital decision aid could enhance the inclusivity of healthcare delivery towards the migrant patient population, bridging the gap towards achieving patient-centred care for this population. Future steps will involve adopting a co-participatory research method to develop and test the digital decision aid, ensuring all needs and preferences are considered.