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Identifying needs for a decision aid to support communication with low-language-proficient migrant patients

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ABSTRACT

Objectives: To conduct a needs assessment for the development of a decision aid pertaining to decision-making about mitigating language barriers in consultations with low-language-proficient (LLP) migrant patients in the Netherlands.
Methods: The needs assessment was conducted using the *Extended Technology Acceptance Model* as a guiding framework. A heterogeneous sample of healthcare providers, LLP migrant patients, and informal caregivers was interviewed ($n = 78$).
Results: Six key needs emerged, with no fundamental differences among the three groups. We identified three key recommendations on the decision aid's *usefulness*: 1) Supporting pre-consultation preparation, 2) Assisting in consultations, and 3) Providing post-consultation support. We also identified three key recommendations on *ease of use*: 1) Multilingual options, 2) Clear multimedia information, and 3) User-friendly and accessible design.
Conclusion: Participants expressed a willingness to adopt a user-friendly digital decision aid that is available in multiple languages and supports communication before, during, and after consultations.
Practice implications: The results of the needs assessment can be utilised to develop a working decision aid and enhance the communication process with LLP migrant patients.

1. Introduction

Language barriers are the most significant obstacle preventing healthcare providers (HCPs) and low-language-proficient (LLP) migrant patients from engaging in effective medical communication [1–3]. Although the health outcomes of LLP migrant patients are often negatively affected by language barriers [4–7], appropriate communication strategies (e.g., professional interpreting services) remain underutilised in addressing these barriers. While many HCPs in the Netherlands do have access to professional interpreting services [1–3,5,7–10], these services are routinely not used. The underutilisation partly stems from HCPs not engaging in shared decision-making (SDM) with their patients about methods to overcome language barriers, and patients and their informal caregivers lacking the necessary information to make an informed decision on this matter [11].

Decision aids are often developed to facilitate SDM concerning complex medical conditions by offering information on available options and outcomes, and helping clarify personal values [12–15]. By adopting the concept of such decision aids, we aim to create a decision aid that will enhance the SDM process for HCPs and LLP migrant patients, employing appropriate communication strategies during consultations to overcome language barriers. The purpose of this paper is to describe the results of the needs assessment conducted for such an aid.

2. Methods

2.1. Study context and recruitment

This study is part of the *Right2Health*[11] project and was approved by the Amsterdam School of Communication Research (ASCoR) (2022-PC-

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[1] *Right2Health* aims to develop and evaluate an evidence-based decision aid for use in language discordant consultations. The consortium constitutes the University of Amsterdam, Radboud University Medical Centres, KU Leuven, Utrecht University and the University of Ghent. See https://www.right2health.eu/ for more information.

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14489) and the Medical Ethical Committee of the Amsterdam UMC (W22_032 # 22.062). Using purposive and snowball sampling methods, a heterogeneous sample of HCPs ($n = 27$), migrant patients ($n = 25$), and informal caregivers ($n = 26$) was recruited between February 2022 and August 2023. We included informal caregivers because their experiences accompanying migrant patients as informal interpreters can offer valuable insights. Eligible participants were contacted via email or phone to inform them about the study. Those interested received information letters and informed consent forms in their native languages (e.g., Dutch, Turkish, Chinese), inviting them to participate. All participants provided written and audio-informed consent. Tables 1 and 2 *and* Figs. 1 and 2 provide an overview of the background characteristics of our interviewees.

2.2. Data collection

The current study's topic guides (*Appendices A, B,* and *C*) were developed using the *Extended Technology Acceptance Model* [16]. Interviews were conducted by the first author (BC) and eight trained interviewers in the interviewees' preferred language: English ($n = 31$), Dutch ($n = 16$), Turkish ($n = 9$), Syrian Arabic ($n = 7$), Mandarin ($n = 6$), Moroccan Arabic ($n = 5$), and Tigrinya ($n = 4$). All interviews ($n = 78$) were audiotaped, transcribed verbatim and translated into English before analysis. On average, the interviews lasted an hour.

2.3. Data analysis

Using ATLAS.ti version 22.0.2, the principal researcher (BC) and two trained research assistants analysed the interview transcripts. *Thematic Analysis* [17] and the Constant Comparative Method [18] were employed to generate key and sub-themes.

The data were analysed using both deductive and inductive approaches. Initially, we employed *Descriptive Coding* [19], where the principal researcher independently coded ten transcripts to create a preliminary codebook. A trained coder, unaware of the aim of the project, then coded six transcripts alongside the principal researcher. Peer debriefing further refined the codebook to enhance reliability. In the final stage, all transcripts were coded independently with the updated codebook by two coders, and we used *Pattern Coding* [19] to organise and identify significant patterns in the data. Our coding process was iterative, as we continually compared initial descriptive codes with pattern codes to develop a reliable and generalisable coding system..

Table 1
Background characteristics of healthcare providers.

Characteristics	$n = 27$	% or mean
Gender		
Female	15	55.56
Male	12	44.44
Mean Age (SD)		45.07 (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.

Characteristic	Patients ($n = 25$)	Informal caregivers ($n = 26$)
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)
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[2]		
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 %)	/

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

3. Results

Six key themes emerged from interviews, and there were no fundamental differences in themes among the three groups. Quotation examples are provided in Tables 3 and 4.

3.1. Perceived usefulness of the decision aid's content

Interviewees had ideas about enhancing the usefulness of a decision aid before, during, and after consultations. Fig. 3 shows of the subthemes that emerged per consultation stage.

First, nearly all participants wanted the decision aid to help navigate language barriers in the pre-consultation stage. They suggested including an overview of translation options, including professional interpreters and digital tools, along with their risks and benefits. A guide on using the aid and information on the importance of overcoming language barriers in healthcare communication was also recommended. Migrant patients expressed willingness to share their Dutch proficiency, interpreter preferences, and privacy concerns with their HCP to streamline the logistics of arranging interpreters and using digital tools.

Second, despite recognising errors in existing digital translation tools, interviewees appreciated them for facilitating independent communication during consultations, especially for sensitive medical

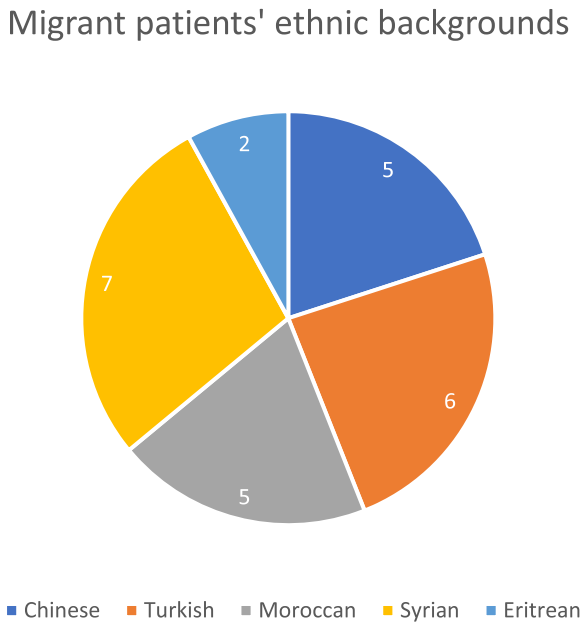

Fig. 1. Overview of migrant patients' ethnic backgrounds interviewed in this study ($n = 25$).

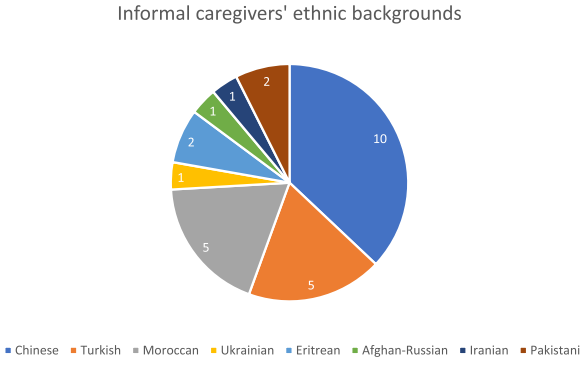

Fig. 2. Overview of informal caregivers' ethnic backgrounds interviewed in this study ($n = 26$).

issues when professional interpreters were unavailable. Some recommended adding a reliable digital translation tool to the decision aid to enhance its utility during consultations.

Third, migrant patients reported difficulties understanding treatment plans after consultations, emphasising the need for accessible translated materials. They suggested the decision aid should enable them to store translated medical information from HCPs and request clarifications afterwards.

3.2. Perceived ease of use of the decision aid's format

Three key recommendations emerged for improving the decision aid's ease of use. First, there was agreement that it should offer multilingual options. While ideally it would be available in all languages spoken in the Netherlands, providing the five to ten most-used languages by patients and caregivers should suffice. Second, participants emphasised the importance of clear multimedia presentations, particularly for older patients who frequently encounter language and digital literacy barriers. They suggested using formats such as infographics and considering video or audio content for those with limited reading abilities. Finally, emphasising availability across consultation phases, interviewees recommended digitising the tool, preferring it as an app or

Table 3
Quotations illustrating interviewees' needs and preferences in relation to the perceived usefulness of the decision aid's content.

Themes	Quotations
Supporting consultation preparation	
	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 think it would help to do it [use the 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 would like to use the decision-aid] before the consultation, because I would like to go to the GP with enough [preparation]. (Eritrean, Male, 43, Informal caregiver)
	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 would tell him [it] [the decision-aid] my preferred language and my level of Dutch and English proficiency to ensure smooth communication. (Syrian, Female, 22, Patient)
	I think it's better to prepare [think about the language barriers and indicate preferences] at home. (Chinese, Female, 25, Patient)
	I would like him [it] [the decision-aid] to know my medical history, and if I need a translator before the consultation. (Syrian, Male, 50, Patient)
	It would be great if I could ask for a translator [before the consultation] through this tool. (Syrian, Female, 39, Patient)
Provide an overview of translation options	*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)*
	Um, maybe the concept [of the 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 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 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)
	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)
Provide instructive information	*Yeah, maybe like, a guide on what to find, where and how to get certain information. (Pakistani, Female, 29, Informal caregiver)*
	[Provide]some guidance on like, using this app or tool? (Iranian, Female, 25, Informal caregiver)
	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)
	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)
	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)
Assisting the consultation process	
Provide a reliable digital translation tool	*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)*
	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

(continued on next page)

Table 3 (*continued*)

Themes	Quotations
	then they will feel like the privacy is kept. (Chinese, Female, 29, Patient)
Provide an overview of translation options	*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)* *You know, it's also like how oh well in the dialect like. I think that's gonna 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)* *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 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)*
Offering continuous support post-consultation	
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) *Each time I collect medication; there's a label on the medication that tells you how to use it. I think it [the decision-aid] would be helpful if they could provide a translated version of that label. (Chinese, Female, 25, Patient)* *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)* *After the GP visit, the GP can send the [information about the] illness to, like the app [decision-aid] or something. (Afghan-Russian, Male, 28, Informal caregiver)* *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)* *And then you get prescribed the medicine, then it also gives you instructions of the medicine. (Chinese, Male, 27, Informal caregiver)*	

website with a simple, intuitive design featuring large text and drop-down menus to improve accessibility for older patients. Fig. 4 shows the sub-themes that emerged per key recommendation.

4. Discussion and conclusion

4.1. Discussion

Migrant patients often prefer to address language barriers by requesting professional interpreters before consultations; however, implementing this is challenging. Ideally, HCPs should involve patients in SDM to overcome language barriers beforehand. However, time constraints, limited access to interpreters, and a lack of systematic approaches in managing language barriers may hinder this process [10,20]. These issues partly explain why, despite interventions [21,22] aimed at raising HCPs' awareness, professional interpreting services remain underutilised [23]. Many migrant patients may also be unaware of all available communication strategies. Providing pre-visit materials, such as lists of communication strategies, could help patients prepare and consider their needs proactively. Understanding the pros and cons of each strategy before SDM might reduce discussion time with HCPs, thus streamlining the implementation of effective communication strategies.

Although several HCPs are aware of communication strategies for mitigating language barriers, selecting appropriate ones is challenging, especially when informal caregivers are involved or when language barriers are not acknowledged [24–26]. HCPs' primary concern is the limited time available for consultation with each patient [27,28]. Although guidelines exist for requesting interpreters in the Netherlands, HCPs find the process complicated and time-consuming [25,28]. A

Table 4
Quotations illustrating interviewees' needs and preferences in relation to the perceived ease of use of the decision aid's format.

Themes	Quotations
Providing multilingual options	*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)* *"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)* *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)* *"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)*
Presenting clear multimedia information	*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)* *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 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 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)* *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 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 think for in the case of my mom it should be visual [images] so she can see it. (Chinese, Female, 32, Informal caregiver)* *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 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)* *"[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)* *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)*

(*continued on next page*)

Table 4 (*continued*)

Themes	Quotations
	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)
	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 think videos and images are easier to follow and understand the information, because I can't read well (Eritrean, Male, 45, Patient)
	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)
	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)
Digitising the decision aid	*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 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 think an app would be nice, because at the doctor, you can't always bring your laptop or whatever, right? (Chinese, Male, 28, Informal caregiver)
	I think an app. I think a lot of people use smartphones, especially if I think about the people that are like my mum and dad's age. I think they use smartphones more than that they open up a laptop and go on a website there. (Pakistani, Female, 29, Informal caregiver)
	My dad is still able to use app, but I think he will still come to us first. But maybe for people who have their like, like their kids a little bit for further away. I think you need to offer both [paper and digital versions] because we still have some old people that don't really use a mobile phone, but my dad uses his mobile phone, so I'm sure he will be okay. But I know, my old neighbour, she doesn't, so… (Afghan-Russian, Male, 28, Informal caregiver
	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 think a website 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)
	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 & app format). It's nice. It's nice to have like options. (Chinese, Male, 29, Informal caregiver)
	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. (Chinese, Female, 33, Patient)
	I think an app on my phone would be easy to use. (Syrian, Male, 48, Patient)
	Make sure that the font is not too small because sometimes older people have difficulties with reading. (Chinese, Male, 27, Informal caregiver)
	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]. (Chinese, Male, 27, Informal caregiver)

pre-consultation decision aid could streamline this and enhance communication by assisting HCPs and migrant patients in choosing the best communication strategy in advance.

Previous literature [29] indicates that gathering information on patients' language proficiency, the complexity of medical situations, and preferences for interpreters' attendance can help guide decisions on communication strategies. A user-friendly, step-by-step guide with simple data entry options (e.g., multiple-choice) is suggested to minimise time and cognitive load [30]. Because all stakeholders must have a clear understanding of the tool's purpose, we recommend including instructions to help users adapt to and intuitively use the decision aid [31].

Discussion surrounding digital translation tools has shown that many HCPs, migrant patients, and informal caregivers are concerned about accuracy, particularly regarding Google Translate's ability to translate complex medical terminology. Nevertheless, most acknowledge advancements in digital translation tools' potential. Suggested improvements include integrating a medical dictionary (e.g., fixed-phrase translators) and more reliable translation tools alongside the decision aid [32]. Users must be informed that digital translators may be less accurate than professional interpreters and provided with guidelines for effective usage [33].

A limitation of this study is its focus on shared priorities among the three groups. Other literature [34] identifies conditions that enhance perceived ease of use, such as smooth integration into HCPs' workflows. Future research should integrate needs assessments with literature findings to further validate these insights.

4.2. Conclusion

This needs assessment aimed to identify the primary needs that can be utilised later to develop a decision aid to assist HCPs and migrant patients in discussing language barriers during consultations. Stakeholders emphasised that the tool should be digital, multilingual, user-friendly, and useful at different consultation stages. Future steps will include a co-participatory research method to ensure that all needs and preferences are considered in the development and testing of the decision aid.

4.3. Practice implications

The decision aid can assist HCPs and migrant patients in choosing suitable communication strategies to overcome language barriers. While intended for primary care due to its gatekeeping role, study participants expressed that it would also be beneficial to make the aid available in secondary and tertiary healthcare settings.

CRediT authorship contribution statement

Schouten Barbara C.: Writing – review & editing, Supervision, Resources, Funding acquisition, Conceptualization. **Jeanine Suurmond:** Writing – review & editing, Supervision, Resources, Funding acquisition. **Yating Fang:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Jiyuan Song:** Writing – review & editing, Formal analysis, Data curation. **Chan Brittany M.C.:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation. **van Weert Julia C.M.:** Writing – review & editing, Supervision, Resources, Funding acquisition.

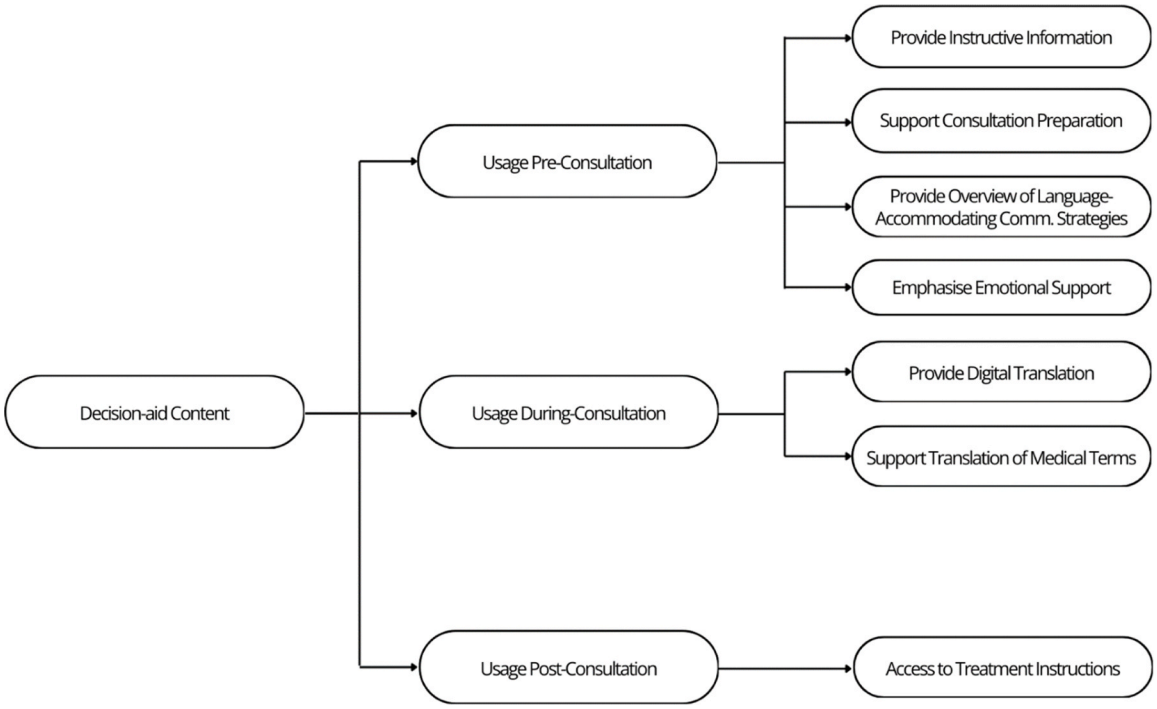

Fig. 3. Concept indicator model of decision aid content.

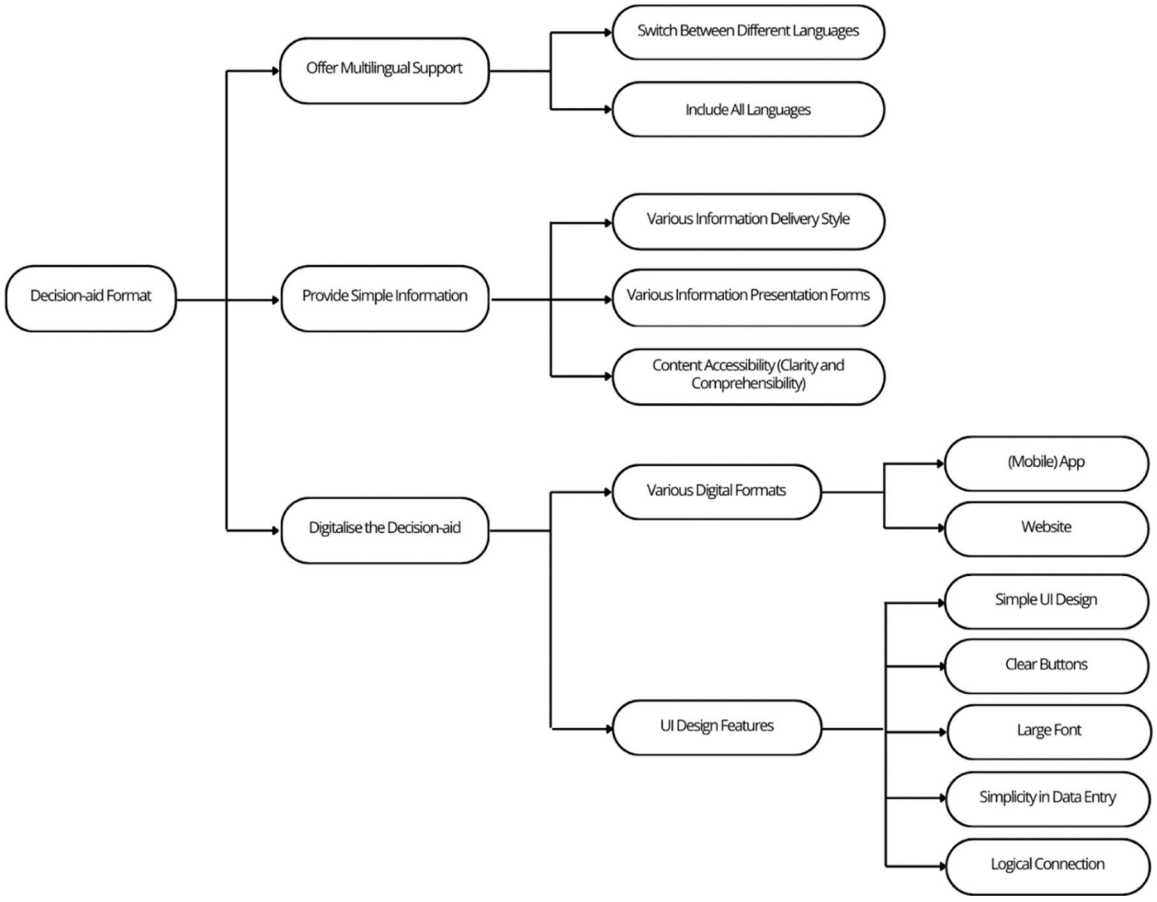

Fig. 4. Concept indicator model of decision aid format.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the first author used Grammarly to shorten the manuscript, improve readability, and correct language. After using this tool, all authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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.

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Appendix A

Topic Guide for Uncovering Migrant Patients' Needs and Preferences for Decision-Aid

Opening: We aim to create a tool to help you and your doctor choose the best ways to tackle these language barriers to help you get all the information you need and feel supported.

1. Previous decision-aid usage
   a. Have you previously used any tools that help you make decisions?
   b. If so, could you tell me what it was like?
   c. What features did you find it useful?
   d. *If no, explain to the participant what it is, and show an online example if necessary*
   e. Based on this example, can you tell me what you like about it?
   f. What do you think can be improved?
   g. Do you think it is easy to use? Is everything clear? Or is it difficult? Why?
2. Decision-aid usage
   a. This tool can be in paper or online format. Where would you like to use this tool? *PROBE: At home, at the clinic?*
   b. *Can you use it at home? (Do they have Internet?)*
   c. When would you like to use this tool? *Before or during the consultation?*
   d. Would you like to use it alone or with a family member?
3. Content
   a. What should the tool have, content-wise? *PROBE: Such as, providing information about requesting for a formal interpreter? Understanding the types of information you need and the communication methods you can use to understand them?*
4. Format
   a. How should the tool look like? *PROBE: Language option(s)? Font? Images? Videos?*
5. Additional information from doctor
   a. What information would you like from your doctor to be able to use this tool?
6. Additional information you can provide
   a. What information are you willing to provide to your doctor for this tool that will help mitigate language barriers in the medical consultation? *PROBE: Perhaps your Dutch speaking abilities? Language preferences?*
7. A.O.B
   a. We have come to the end of this interview. Was there anything which we haven't talked about?
   b. Do you have anything you'd like to add? Before ending this interview, I was wondering if you might know other migrant friends who also speak little to no Dutch, and might be interested to participate in this study? [write answer in notes]
   c. And would you also be interested in participating in follow-up studies that will be part of the bigger project? [write answer in notes]
   d. Once again, thank you for your time and interest!

Appendix B

Topic Guide for Uncovering Informal Caregivers' Needs and Preferences for Decision-Aid

Opening: We aim to create a tool that will help you, the patient, and the doctor to choose the best ways to tackle these language barriers to help the patient get all the information he/she needs and feel supported.

1. Previous decision-aid usage
   a. Have you previously used any tools for making decisions (i.e., a decision aid)?
   b. If so, could you tell me what was it like?
   c. What features did you find it useful?
   d. *If no, provide participant with an example and explain the features.* Based on this example, can you tell me what you like about it?
   e. What do you think can be improved?
   f. Do you think it is easy to use? Is everything clear? Or is it difficult? Why?
2. Decision-aid usage
   a. If the tool is in digital/paper format, where would you like to use this tool with the patient? *PROBE: At home, at the clinic?*
   b. *Can you use it at home? (Do they have Internet?)*
   c. Would you prefer to use the tool before or during the consultation with the patient? Why?
3. Content
   a. What should the tool have, content-wise, for it to be useful? *PROBE: Such as, providing information about requesting for a formal interpreter? Understanding what kind of information, the patient can get from the doctor? The (communication) methods (e.g., professional interpreters) the patient can use to understand the information?*
4. Format
   a. How should the tool look for it to be easy to use? *PROBE: Language option(s)? Font? Images? Videos?*
5. Additional information from doctor
   a. What information would you like from the doctor to be able to use this tool?
6. Additional information you can provide
   a. What information are you willing to provide to your doctor for this tool that will help mitigate language barriers in the medical consultation? *PROBE: Perhaps your contact details? Language preferences? Need for additional information (e.g., written/visual, etc.)?*
7. A.O.B
   a. We have come to the end of this interview. Was there anything which we haven't talked about? Do you have anything you'd like to add?
   b. Before ending this interview, I was wondering if you might know other migrant friends who are informal caregivers, caring for patients who speak little Dutch, and might be interested to participate in this study? [write answer in notes]

c. And would you also be interested in participating in follow-up studies that will be part of the bigger project? [write answer in notes]
d. Once again, thank you for your time and interest!

Appendix C

Topic Guide for Uncovering Healthcare Providers' Needs and Preferences for Decision-Aid

Opening: We would like to explore your needs and preferences for a decision-aid that will help mitigate language barriers.

Before diving into the main question, I would like to ask:

– Was there a time where you had trouble with conveying something to your patient so they could understand?

[PROBE] Do you recall any cases where a formal or informal interpreter was present? Was there a difference in terms of the communication methods you used?

[PROBE] Based on your experience, do you also think there are differences depending on:

a. *Dutch proficiency: How well the patient could speak Dutch?*
b. *Health condition and treatment phase: How serious the patient's illness was?*
c. *Sex and age: Was it a female/male patient? Do you notice a difference in the communication methods used when it was a female/male patient? How about age (i.e., when the patient is young or old)?*
d. *Level of acculturation: Do you think the patient was well integrated to the Dutch culture?*
e. *Health literacy: Do you think the patient was able to understand the health information (you provided) well?*

Onto the main questions. First, I want to ask if you have ever used any decision-aids in practice?

- If yes: Could you provide examples of the ones that you found useful, and explain *why* they were useful?
  - o *[PROBE] Would you use these decision-aids to make shared decisions with patients on what communication methods to use to mitigate language barriers?*
- If no, but is aware they are available: Why not?
  - o *[PROBE] Was it because you didn't think it would be useful, that it would be more time consuming to use it, or that it didn't seem easy to use?*
  - o *Would you use these tools to make shared decisions with patients on what communication methods to use to mitigate language barriers?*
- If no, but unaware:
  - o *[PROBE] Do you know what decision-aids are? If no, explain to GP: A decision-aid is a tool that helps HCPs have discussions with their patients about decisions; these aids provide information about options, help clarify personal values, and in some cases, even help collect biomedical data for HCPs (Elwyn et al., 2009).*
  - o *Would you use these tools to make shared decisions with patients on what communication strategies to use to mitigate language barriers?*

As you might already know, decision-aids can come in many forms – paper format, digital format (i.e., websites, apps, etc.). The common feature that they bear though is that they outline the options, along with the risks and benefits of these options for patients. Many of them also have additional features, such as separate portals for healthcare professionals and patients to log onto, where healthcare professionals can look at the (biomedical) data that patients enter themselves. Additionally, sometimes these tools also have extended tools that help patients or healthcare providers in navigating the consultation, such as question prompt lists. With this in mind, I want to ask,

i. Should the decision-aid be used on its own (like a website), or should it be implemented in the electronic system your clinic/hospital (EPIC/ICT system) currently uses?
ii. If it should be used on its own, what (digital medium) should it preferably be?
   [PROBE] An app? Website? AI-based platform?
iii. What is needed for your clinic to implement such a tool?
iv. How do you see this tool being useful to mitigating language barriers with migrant patients who do not speak Dutch?

[PROBE] What do you think the decision-aid should have, content wise, if it is aimed at helping you to mitigate language barriers?

What do you think the decision-aid should look, format wise, if it is aimed at helping you to mitigate language barriers?

What information from your patients who speak little Dutch will you need to know to help you know how to mitigate language barriers with them?

We have come to the end of this interview. Do you have something to add, something that we did not discuss yet?

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