Title: The perceptions of translation apps for everyday healthcare in healthcare workers and older people: a multi-method study.

Running title: Technology for everyday health conversations

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AP, SW, TWHC, DL, BH, XL, EZ, MMM, AMYG, EY, and FB contributed to the conceptualisation and design of the study. AP and FB led the study. Data collection and data analysis was completed by AP, KH and SW, and all authors contributed to the interpretation of the findings. AP, KH, SW and FB drafted the manuscript. TWHC, DL, BH, XL, EZ, MMM, AMYG, and EY contributed to proofing and further revisions of the manuscript.

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The perceptions of translation apps for everyday healthcare in healthcare workers and older people: a multi-method study.

Abstract

Aims and objectives: Our aim was to understand the attitudes and perceptions of older people with limited English proficiency (LEP) and healthcare workers to using mobile translation technology for overcoming language barriers in the healthcare setting.

Background: Australia's cohort of people aged 65 and over has a sizeable population with LEP. In healthcare settings, difficulties with communication may potentially result in inadequate care. Mobile language translation applications have been identified as a potential way to improve communication between patients and healthcare staff when used as an adjunct to professional interpreters in low risk scenarios, however the perceptions of the use of mobile translation applications for such communication is unknown.

Methods: A multi-method design was used. Focus group discussions were conducted with older people from culturally and linguistically diverse (CALD) backgrounds and nursing and allied health professionals to understand their perceptions of translation technology. Qualitative data were analysed using inductive content analysis. Qualitative findings were reported using the Standards for Reporting of Qualitative Research (SRQR) checklist. Participants also appraised three existing translation apps via survey and results were analysed using descriptive statistics.

Results: Overall, older people from CALD backgrounds (n=12) and healthcare staff (n=17) agreed that translation technology could play a role in reducing communication barriers. There was enthusiasm amongst older people to learn and use the technology, while healthcare staff saw the

potential to address communication barriers in their own work. Barriers identified by older people and healthcare staff included: accuracy of translation and phrases, possible technological learning curves, risk of mistranslation in high-risk conversation and inability to check accuracy of translation. Fixed phrase translation apps were seen as more favourable than real-time voice-to-voice mobile translation applications.

Conclusions: Older people from CALD backgrounds and healthcare staff were open to the use of mobile translation applications for everyday healthcare communications.

Relevance to clinical practice: Translation applications may have a role in reducing language barriers in everyday healthcare communication but context, accuracy and ease of use need to be considered.

Keywords: communication, healthcare, language, technology, translation, multi-method

What does this paper contribute to the wider global clinical community?

- Older people and nursing staff see the potential of using healthcare related translation apps for overcoming language barriers if an interpreter was unavailable.
- Some staff already report using translation apps to overcome language barriers in the workplace, despite limited evaluation of its use and widespread promotion of using interpreters for all aspects of healthcare.

Introduction

Australia is one of the most culturally diverse countries in the world, with almost half of the population (49%) either born overseas or with at least one parent born overseas (Australian Bureau of Statistics, 2016b). With this comes a diversity of languages spoken. In 2016, 21% of Australians spoke a language other than English at home, totalling over 300 languages spoken in Australian homes (Australian Bureau of Statistics, 2016b). Older people make up the majority of those born overseas or who speak a language other than English at home (Australian Bureau of Statistics, 2016a). Of those, 27% have limited English proficiency (LEP) because they do not speak English well or at all (Australian Bureau of Statistics, 2014). Even for those who do speak English, proficiency may decline with increasing age or with the onset of cognitive impairment or dementia (Access Economics, 2009; De Bot & Clyne, 1994; Jefferies, 2006; Rao, Warburton, & Bartlett, 2006).

Furthermore, recently arrived older migrants to Australia from countries where English is not the main language are likely to have very limited English proficiency(Smart, De Maio, Rioseco, & Edwards, 2017).

Clear communication is an essential component of safe and high quality healthcare. Those from culturally and linguistically diverse (CALD) backgrounds with LEP may not receive equitable care if their healthcare workers do not speak their primary language(Houston & Cowley, 2003). In Australia, the provision of interpreters is enshrined in healthcare policies in facilitating communication when there is a language barrier (Victorian Government Office of Multicultural Affairs and Citizenship, 2014). A recent Australian study found that less than a quarter of hospital patients identified as needing an interpreter receive an interpreter(Blay et al., 2018). To overcome this, healthcare workers “get by” with gestures, facial expressions, and increased volume or by using minimal key words in the target language(Diamond, Schenker, Curry, Bradley, & Fernandez, 2009; Villarruel, Portillo, & Kane, 1999). The “getting by” approach has the potential for miscommunication, which could result in inappropriate or inadequate care provision. Family members or bilingual colleagues are often used to interpret in healthcare situations in lieu of a trained professional interpreter (Gray, Hilder, & Donaldson, 2011). Family members may be suitable in some aspects of healthcare translation(Hilder et al., 2017; Pines, Jones, & Sheeran, 2019), however they are at risk of being exposed to highly sensitive information(Nielsen, Abdulkadir, Lynnerup, & Sodemann, 2019), and may not be able to adequately translate technical medico-legal phrases or words(Attard et al., 2015). There are similar challenges when bilingual colleagues are used(Ali & Johnson, 2017). For instance, they may not always be available, they may be uncomfortable acting in the interpreter role yet may be reluctant to express this to colleagues(White et al., 2018), and there is an increased risk to the patient due to potential mistranslation(H. Chang, Hutchinson, & Gullick, 2019).

Although there have been improvements in access to and use of interpreters(Hlavac, Beagley, & Zucchi, 2018), there are still times when interpreters are not available, and using interpreters for everyday communication is not always possible such as for basic low-risk conversation. As it is recognised that it is not appropriate nor feasible to use an interpreter in every healthcare situation and “getting by” is not considered a safe and effective solution, there is a need to explore alternatives. The use of mobile translation applications is one potential way to improve communication between patients and healthcare staff, not to replace interpreters, but to support everyday communication and enable communication of care needs(D. Chang, Thyer, Hayne, & Katz, 2014). The literature exploring mobile translation applications is in its infancy and studies to date

have only explored its in more acute settings, for example in emergency settings(Khoong, Steinbrook, Brown, & Fernandez, 2019; Spechbach et al., 2019; Turner et al., 2019). There are generally two types of translation apps; fixed-phrase translation apps, and open translation apps. Fixed phrase translation apps, which translate only fixed phrases, have been shown to aid healthcare workers in communicating in a language discordant situation(Albrecht, Behrends, Matthies, & von Jan, 2013), and have a high level of acceptability when an interpreter is not available in a timely manner(Day & Song, 2017). Google Translate is an example of an open translation app, which enables free translation between two languages. Evidence indicates that Google Translates accuracy level differ between language groups(Chen, Acosta, & Barry, 2016; Khoong et al., 2019; Patil & Davies, 2014), and that only short simple phrases are more accurately translated(Miller, Harvey, Bedrick, Mohan, & Calhoun, 2018). As a result there is caution against its use in acute settings, as these conversations typically involve consent or complex medical information where a high degree of accuracy is needed(Beh & D., 2015; D. Chang et al., 2014; Patil & Davies, 2014). In sub-acute settings, such as rehabilitation or specialised geriatric care, the role of mobile translation applications in enabling everyday healthcare conversations is unexplored. It is also unknown how older people from CALD backgrounds and healthcare workers perceive the use of translation technology in healthcare settings.

Since little is understood about the perceptions and attitudes of older CALD Australians and healthcare workers about the use of mobile translation in everyday healthcare communication, this study aimed to explore the perceptions and attitudes towards mobile translation applications for low risk healthcare conversations. We aimed to explore: 1.) the current experiences of mobile translation applications amongst older people from CALD backgrounds and healthcare workers, and 2.) the perceived barriers and facilitators to the use of mobile translation applications for everyday healthcare conversations.

Methods

This multi-method research involved a consultation comprising of the following components: a focus group, and a brief survey collecting demographic information and an appraisal of each translation app using a rating scale. Ethical approval was attained from the St Vincent's Health Melbourne Human Research Ethics Committee (ref: HREC17SVHM228). We report the findings in the paper using the Standards for reporting qualitative research (SRQR) checklist(O'Brien, Harris, Beckman, Reed, & Cook, 2014) (See supplementary file 1).

Participants

There were two groups of study participants: older people from CALD backgrounds and healthcare staff (nursing and allied health). Both types of study participants participated in the consultations in a group format.

For the CALD group, we recruited a convenience sample of older people from Greek and Chinese local ethno-specific community groups. Eligible participants were aged 65 years and over, living in the community, and without significant self-reported visual or auditory impairment that would preclude their ability to take part in a consultation or impact their ability to use and appraise translation apps. One consultation session was conducted with each of the ethno-specific community groups, lasting approximately 60-90 minutes.

The nursing and allied health staff were recruited from three large public hospitals in metropolitan Melbourne, Australia. They were invited to the consultations if they were working in a subacute or aged care hospital setting. One consultation session was conducted at each of the three hospitals, lasting approximately 60 minutes.

Consent

All participants provided written informed consent. For those with LEP, information was provided using professional interpreters and bilingual staff, and consent forms were translated into Greek or Chinese.

Data collection

Focus Group Discussion

The focus groups consisted of short semi-structured questions exploring participants' experiences with mobile translation applications, perceptions of using mobile translation applications in the healthcare setting, and the perceived barriers and facilitators to using mobile translation applications in the healthcare setting. An accredited interpreter helped to facilitate the discussion with the older Greek and Chinese participants. Focus groups were conducted at two community centres within Metropolitan Melbourne, to ensure that the participants were in a familiar environment, and to facilitate participation. Nursing and allied health staff consultations were conducted at three hospital sites to improve the likelihood of nursing and allied health staff attending from each site. The focus group questions included six key questions: (1) "Have you ever used technology to translate information from one language to another before?" (2) "Have you ever used or experienced a healthcare worker using technology to translate information? Please provide some information about how this experience was for you." (3) "What role do you see technology playing in communicating everyday healthcare conversations between older people from CALD

backgrounds and their healthcare workers?" 4) "Do you think technology could be used in healthcare settings for everyday communication?" 5) "Can you think of any barriers that could prevent the use of technology being helpful for communicating everyday healthcare conversations?" (6) "Can you think of some strategies to address these barriers?" Two members of the research team (S.W and A.G) scribed the discussion during the focus groups.

Appraisal of Language Translation Apps

Three iPad compatible translation apps were selected for demonstration and appraisal by the participants – CALD Assist, TalkToMe and Google Translate™. CALD Assist and TalkToMe contained pre-set health phrases that could either be translated into different languages through a combination of audio, text and image output. Google Translate™ allowed for real-time audio or text translation and required an internet connection. The were selected on the basis of their suitability for enabling everyday conversations in healthcare settings evaluated in a previous study (Panayiotou et al., 2019) and on the basis of their familiarity and pre-existing use in the study sites. Apps were included if they were developed for language translation purposes, were available at no cost, were available on an iPad (Apple Inc., California, USA), and enabled translation to or from Mandarin and Greek. These translation apps were demonstrated by the research team, and participants spent approximately 5-10 minutes interacting with and appraising each app on iPads provided by the research team.

After the demonstration, participants completed a survey that asked about their basic demographic information, confidence and experience of using smart technology (e.g mobile and tablet devices, laptops and computers), and the ease of use and satisfaction of the three translation apps in the demonstration. The survey was translated into Greek and Chinese to allow the CALD participants to complete. Estimated confidence, ability and usage of smart technology was measured using a rating scale (0=no confidence/ability/usage, 10= high confidence/ability/usage). The translation apps were appraised using rating scales regarding the ease of use (0=not at all easy to use, 10 very easy to use) and for satisfaction, on a scale of 0 – 5 (0=not satisfied at all, 5=very highly satisfied). Open-ended questions asking participants to describe design features that were particularly liked or disliked were also included. Rating scales in the questionnaires were based on the System Usability Scale (Brooke, 1996), with the questions simplified to accommodate participants of all education and literacy levels. Content validity of the surveys was ensured by developing the survey in consultation with researchers on the team who were subject matter experts, and translated surveys were read by

bilingual researchers to ensure accuracy. In addition, researchers noted any comments made about the translation apps during the demonstration, interaction and appraisal phases.

Data Analysis

Quantitative data from the surveys was managed using SPSS v23 (IBM, NY) and summarised through descriptive statistics. We used inductive content analysis(Elo & Kyngäs, 2008) to analyse the qualitative data from the focus groups and open ended questions. Focus group responses were transcribed verbatim and managed using Microsoft Word (Microsoft, Seattle). Open-ended questions from the surveys were transcribed in English after translation, and managed using Microsoft Excel (Microsoft, Seattle). Two research members (A.P and K.H) who attended the consultations analysed each response to determine meaning and generate codes. The codes derived from the initial analysis were inductively refined into categories. Both researchers reviewed the categories for similarities, and then the categories were then summarised into themes. We factored in the backgrounds of the researchers analysing the data, including professional discipline (AP-clinical neuropsychologist, KH-epidemiologist) and cultural background (AP-Greek, KH-Chinese) on how this may influence the content analysis. Trustworthiness was ensured using data source triangulation(Carpenter & Suto, 2008). For the community groups, we compared the focus group notes and surveys for similarities and differences between culture group and experience of usage of translation technology. For the nursing and allied health staff consultations, focus group notes and surveys were compared to observe similarities and differences between workplace policies and attitudes towards use of translation apps. Two researchers independently assessed the focus groups and discussed their perceptions and findings from each focus group. This ensured that data was saturation was reached prior to content analysis.

Results

Participant Characteristics

Nine older people from the Chinese community and five older people from the Greek community took part in the consultations. One Chinese participant withdrew due to visual impairments affecting the ability to appraise the translation apps, while one Greek participant withdrew as he was not able to use the device. No data were collected from the withdrawn participants, and the final sample size

was eight older Chinese and four older Greek participants. The mean age of the participants was 76.3 (7.6 SD) years and more were male (n=7; 58.3%). The average time participants had lived in Australia was 24.9 (15.1 SD) years and educational attainment varied from no formal education to tertiary level. The demographic data of participants from the community consultations are summarised in Table 1.

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Seventeen healthcare staff from three Melbourne metropolitan public health services took part in the consultations. The mean age of participants was 43.2 (10.5 SD) years and most were female (n=14; 82.4%) and had a nursing background (n=14; 82.4%). Over half (n=10; 58.8%) of respondents had worked in healthcare for 11 years or more. The demographic data of participants from the healthcare staff consultations are summarised in Table 2.

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Participants from the CALD community groups reported using smart technology an average of 3.2 (6.1 SD) hours per week. On a Likert scale from 0-10, median ability to use smart technology was rated at 3.0, and confidence was rated at 4.5 (Table 3).

Healthcare staff reported using smart technology (e.g. smartphone, tablet device, laptop) an average of 24.4 (18.7 SD) hours per week. On a Likert scale from 0-10, median ability to use smart technology was rated at 8.0, and confidence was rated at 8.0 (Table 3).

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Focus Group Findings

Role of translation technology for facilitating communication in healthcare

Participants in both consultations believed that language translation technology had a role in facilitating communication in healthcare settings. The older participants from CALD communities reported that technology could assist them to overcome language communication barriers with their healthcare providers and reduce their dependency on adult children who are often required to translate information:

“Every time I go to hospital I have to bring my daughter. It’s difficult to bring my daughter. Technology would be useful in this situation.” (participant from Chinese community consultation)

“It’s the worst thing which happens when you are in a place when you can’t understand and express yourself. It would be good [to use technology]” (participant from Greek community consultation)

Healthcare staff reported that technology would aid their clinical duties by playing a role in communicating basic instructions or questions and identifying care needs when patients do not speak the same language (e.g. simple introductions and greetings, to ask patients if their family member can be called, or to ask if a patient is in pain).

Staff also identified that technology could help to build rapport with patients, and help both parties learn a few keywords in the other person’s language, but were cautious regarding the accuracy of language translation technology, particularly for different language dialects. They also questioned the suitability of translation apps for complex or important communication.

Experiences with translation technology for communication

Older participants from CALD communities indicated that they had experience using technology for communication. However, most of these instances were not related to healthcare. These included instances in retail, or at home when an electrician was engaged for repairs or when receiving written information in the mail:

“I had an electrician come to fix things. I said to the electrician I have no English. He used his phone.” [Facilitator asked: “How did that make you feel?”] “It solved the problem.” (participant from Chinese community consultation).

“A letter arrives in English, without asking my children I use Google to find out what it vaguely means.” (participant from Greek community consultation).

One participant described an experience in which the language translation technology was not suitable as the information was highly complex:

“A [medical] report was sent to me, I used my device to translate it. I got more confused as it didn’t make sense. I did not want to bother my children. The words used are even difficult for my children.” (participant from Greek community consultation).

Healthcare staff reported a variety of experiences and levels of success with using translation technology. Outside of healthcare, participants had used it to communicate with overseas relatives and during their travels to non-English speaking countries. Typically voice-to-voice translation apps were used and the most commonly cited app was Google Translate™. Overall, the success of these

experiences was mixed. Staff reported success when using the translation apps to communicate with relatives overseas, however, some participants struggled between the spoken and written form of languages, and described issues relating to grammar and syntax that made the translation difficult.

In healthcare settings, staff described instances in which they had used language translation apps with patients who did not speak their language with mixed success. Google Translate™, TalkToMe and iTranslate were the most frequently cited apps. One participant described a positive experience of using the real-time voice-to-voice translation feature of Google Translate™ to communicate basic needs with a Spanish speaking patient who was unable to read:

“I didn’t want to wait for (an) interpreter, and I didn’t want to always ring the daughter. She was happier because it [the technology] made her comfortable.”
(participant from healthcare staff consultation).

Another participant described using the TalkToMe translation app to help to identify that a patient tended to call out more when in pain or needed more help:

“It [TalkToMe] helped us [nurses] to establish [the patient’s] care needs.”
(participant from healthcare staff consultation).

Not all experiences with language translation apps were positive. There were instances in which real-time voice-to-voice translation using apps such as Google Translate™ had not recognised the words accurately due to background noise or different dialects spoken by patients:

“Sometimes it brings up gibberish.” (participant from healthcare staff consultation).

However, healthcare staff indicated that despite not always working, they felt that the effort was appreciated by their patients and that it often helped to build rapport.

Current communication practices

Healthcare workers described a range of current practices when communicating with patients who did not speak the same language. These included relying on the patient’s family members to translate conversations, asking other bilingual/multilingual staff members for assistance, using cue cards or pictures to communicate key words, using body language and gestures, and using remaining interpreter time booked for other patients or by other healthcare professionals.

314 “Usually I will ask the family, or ask the family to write a list of basic commands in their
315 language and how to pronounce it.” (participant from healthcare staff consultation).

316 Nursing staff in the consultations reported that they were generally unable to or discouraged from
317 booking an interpreter due to limitations related to time and cost.

318 “[...Nursing] staff can’t book interpreters...” (participant from healthcare staff consultation).

320 *Barriers to using translation technology to communicate*

321 For the older participants from CALD communities, the major barrier to using translation technology
322 for communication was an unfamiliarity with, or lack of skills in using the technology. Many
323 participants indicated that their children had given them smart phones to use, however many did
324 not have time to learn how to use it, nor did their children have time to teach them. Participants
325 indicated that learning how to use translation technology would overcome this barrier.

326 “I have no ideas about technology. I would like to. It would be good, even to pay a bill – it
327 all involves technology. My children are busy so it would be good to do myself.” (participant
328 from Greek community consultation).

329 “If you can’t read, it’s like being blind [...] we feel technology blind.” (participant from
330 Chinese community consultation).

331 Healthcare staff identified four broad barriers to using translation technology to communicate in the
332 healthcare setting: *patients, language, workplace* and *technology*. Participants identified that
333 translation technology may not be suitable for use with particular types of patients, such as those
334 with delirium, significant sensory impairments or those who are verbally or physically aggressive.

335 “On this ward, [translation technology has] a small role as patients are too cognitively
336 impaired.” (participant from healthcare staff consultation)

338 Issues related to language included the tendency for language translation apps to omit rare
339 languages or particular dialects and the concern regarding translation accuracy. Staff reported that
340 workplace policies prevented the use of personal devices (e.g. smartphones) during work hours or
341 explicitly prevented the use of language translation apps with patients. Additional workplace
342 barriers included access to a stable internet connection and infection control as staff were unsure
343 how to safely use the technology with multiple patients. Participants also considered unfamiliarity

with or limited ability to use technology by both patients and staff would affect the potential use in healthcare settings.

“Nurses need to be confident using the app, as not everyone is ‘tech-savvy’.” (participant from healthcare staff consultation).

Healthcare staff provided some potential strategies to address the barriers to using translation technology. These included using an amplifier, headphones or relying on pictures within the language translation apps for patients with a hearing impairment, and to avoid their use with agitated or cognitively impaired patients. For rare languages or dialects, participants suggested determining whether the patient could speak another language that was available within the app. To address infection control, participants suggested either to have a device (e.g. iPad) allocated for each patient, or to protect each device with a case that could be easily cleaned or regularly changed. Healthcare staff also indicated that education to increase familiarity with technology would be welcomed, and that the use of language translation technology could be led by the healthcare worker, rather than the patient.

Perception and appraisal of translation apps

There was enthusiasm amongst the older community members when interacting with the translation apps.

“I want to use it, I never want to let it out of my hands.” (participant from Greek community consultation).

In general, older community members thought that the translation apps were fairly easy to use and that they would help to overcome language barriers. Participants liked that the translation apps could convey their native language audibly and visually using text. Participants also indicated that they could learn English phrases using the apps.

“Now I am officially Australian Chinese.” (participant from Chinese community consultation).

“I can speak English pretty good but when I can’t express myself this would work.”

(participant from Greek community consultation).

There was some frustration expressed regarding the menu options and pre-set phrases of two of the apps (TalkToMe and CALD Assist) only being available in English. However, participants accepted

that these apps were designed to be led by staff in a healthcare setting. While participants enjoyed the real-time voice-to-voice translation function of Google Translate™, several participants found it difficult or confusing to use, and accuracy of the translation was a problem.

“It’s not coming out right. I said ‘I can’t see clearly because of the old age eyes’ and it [Google Translate™] said ‘I spent my eyes’...” (participant from Chinese community consultation).

“It might be good but it is very confusing.” (participant from Chinese community consultation).

Similarly, there was enthusiasm amongst the healthcare staff when interacting with the apps. Features that the staff particularly liked were the suitability of the pre-set phrases for their line of work, the inclusion of pictures to support the translation, and the search function that enabled phrases to be identified on the basis of key words (e.g. pain, falls). However, participants also highlighted that some key information they would normally communicate with their patients was not included as pre-set phrases, and some languages they encountered in the course of their work (e.g. African languages) were absent in TalkToMe and CALD Assist. Although Google Translate™ was seen as a more flexible option, the need for a stable internet connection to enable real-time translation was seen as a negative, and there was concern regarding the accuracy of the translations.

Appraisal of Demonstrated iPad Compatible Apps

Participants from the CALD community groups rated the three apps similarly in terms of their perceived ease of use and overall satisfaction. On a Likert scale from 0-10, median ease of use ranged from 4.5-5.0, with TalkToMe and Google Translate™ both receiving the highest ratings. On a scale from 0-5, median overall satisfaction ranged from 3.5-4.0, with CALD Assist and TalkToMe receiving the highest ratings.

Healthcare staff reported higher perceived ease of use and similar levels of overall satisfaction. Median ease of use ranged from 7.5-9.0, and median overall satisfaction ranged from 3.0-4.0, with CALD Assist receiving the highest ratings on both of these.

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Discussion

The results of our study demonstrate that both healthcare workers and older people from CALD backgrounds identify the use of translation apps as a potential method of overcoming communication barriers in the healthcare setting. Both older community members and healthcare staff reported being familiar with language translation technology. However, this was predominately in settings outside of healthcare. Those who had used the technology reported positive experiences when used for translating simple conversations, such as those in retail, however, experiences that involved translation of more complex information, such as translating a medical letter, were less favourable.

While some staff identified using interpreters, the use of interpreters was often limited to excess time that was not being used by other professionals, and some healthcare workers revealed that they were generally discouraged from booking interpreters themselves. In Australia, policies and legislation ensure that interpreters are provided free of charge should they be required (Hlavac, Gentile, Orlando, Zucchi, & Pappas, 2018). Although the provision of interpreting services has improved, our findings indicate that there is still minimal use of interpreters. Nurses and interpreters are still using sub-optimal methods of overcoming language barriers, in the absence of timely access to interpreters when required. In lieu of interpreters, healthcare staff indicated that they used primarily 'getting-by' methods to overcome communication barriers. This suggests that despite interpreters being provided under policy and legislation, staff still face barriers in accessing interpreters when required.

To overcome these barriers, some healthcare staff reported using translation apps with patients in the healthcare setting. The most commonly used apps were Google Translate™, TalkToMe and iTranslate, which healthcare workers reported using on their own personal devices. Some participants reported positive experiences where the app worked to quickly identify care needs, whereas others reported negative experiences marked by poor accuracy or poor functioning of the real-time voice-to-voice translation feature. Yet, despite experiences where the app did not work, there were no reported adverse impacts on rapport. In fact, healthcare staff reported that their patients had appreciated the effort and that it helped to strengthen the relationship even if the technology had failed. This concurs with previous studies outlining level of satisfaction in clinical settings when using translation apps for overcoming language barriers (Albrecht et al., 2013; Sreekanth, 2010). The use of personal devices raises issues that may contravene hospital policies and procedures. However, there is little evidence about the suitability of personal devices for the purposes of work, with the literature mostly focused on their use for non-work related purposes

(Bautista, 2019; Brandt, Katsma, Crayton, & Pingenot, 2016), and attitudes towards their use(Koehler, Vujovic, & McMnamin, 2013). Future studies exploring the suitability of personal devices in the delivery of healthcare is needed. While older community members in our study described past and mostly positive experiences with translation apps, it was not clear whether these experiences were using the own devices. Health information technologies can reduce racial and ethnic disparities in the healthcare setting(Lopez, Green, Tan-McGrory, King, & Betancourt, 2011), and there is a potential to promote older CALD Australians to use translation apps in low risk healthcare communication to reduce such disparities.

Other barriers perceived by healthcare staff and older people that would limit the use of translation apps in healthcare settings included unfamiliarity with technology, limited availability for less common languages or dialects, unsuitability for particular patients, insufficient infrastructure, and stipulations in workplace policies. These perceived barriers are aligned with the challenges reported by nursing staff during a six-week trial of translation technology in the hospital setting(Albrecht et al., 2013), who described difficulties using the technology with older patients who were unfamiliar with technology, patients with visual impairment or illiteracy, and when the desired target language was not available. Given these barriers, the use of translation apps for everyday communication may not be suitable for everyone.

Google Translate™ has multiple features for translation, including real-time voice-to-voice translation feature. In this study, shortcomings in the accuracy and functionality of Google Translate™'s voice-to-voice translation function were revealed by participants during the appraisals. This is consistent with previous studiess that identified limitations with the text-based language translation function(Beh & D., 2015; Patil & Davies, 2014). The evaluation of voice-based translation in the current study is considered a more suitable feature in a dynamic environment such as a healthcare facility where faster and direct translation can occur. In contrast, translation using fixed phrases were generally considered easy to use, and the addition of pictures was considered a useful addition to aid in convey information. The findings from participants' appraisal suggests that despite the flexibility of Google Translate™, fixed-phrase translation apps with audio-visual features were preferred by both older people and nursing and allied health staff.

Limitations:

There were a few limitations with our study. Firstly, we only conducted consultations with two older migrant communities of Australia, and subsequently the findings from our focus groups and surveys may lack generalisability to other older migrant communities of Australia. In addition, we recruited through ethno-specific organisations, and thus may have an unrepresentative sample of participants accessing community services. Our healthcare consultations were conducted with nursing and allied health staff working in sub-acute aged care settings, and some of the consultation findings may not generalise to other areas of aged care or healthcare. Small sampling sizes also meant that we were unable to evaluate differences between cultures and healthcare professionals. While the surveys used in this study were based on the system usability scale, with questions simplified to enhance readability, they were ultimately designed to be explorative and we did not assess their validity.

Conclusion:

The use of mobile translation apps was considered to be a method of overcoming communication barriers for simple information, especially when apps with supporting images and pre-set health phrases were initiated by healthcare workers. Concerns were identified in relation to the translation accuracy for more complex information and issues related to familiarity, infrastructure and policy were recognised as barriers that would impact on use in healthcare settings. Further research may involve evaluating translation apps for this purpose in healthcare settings, or changing policies and procedures on the use of translation apps in healthcare settings for everyday conversations where an interpreter may not be feasible. Furthermore, future studies may explore differences in perceptions of language translation technology between different cultural groups and within different healthcare professionals.

Definitions and Abbreviations

Apps - applications

CALD – Culturally and linguistically diverse

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Table 1: Demographic characteristics of participants in the community consultations.

Participant characteristics	Participants (n=12)	
	<u>n of participants</u>	<u>Percentage</u>
Community		
Greek	4	33.3%
Chinese	8	66.7%
Age (years)	76.3; 7.6 (mean; SD)	65-86 (range)
Gender		
Male	7	58.3%
Female	5	41.7%
Highest Level of Education		
No formal education	1	8.3%
Primary school	4	33.3%
Secondary school	2	16.7%
Certificate or diploma	1	8.3%
University degree	4	33.3%
Lived in Australia (years)	24.9; 15.1 (mean; SD)	8-58 (range)
Age when learned English (years)	25.6; 13.2 (mean; SD)	17-49 (range)
Confidence in speaking English (Likert scale 0-10 ^a)	1.0 (median)	0-7 (range)

^a0= not confident at all, 10= completely confident.

Table 2: Demographic characteristics of participants in the healthcare staff consultations.

Participant characteristics		Participants (n=17)	
		<u>n of participants</u>	<u>Percentage</u>
Age (years)		43.2; 10.5 (mean; SD)	24-62 (range)
Gender			
Male		3	17.6%
Female		14	82.4%
Country of birth			
Australia		8	47.1%
Elsewhere		9	52.9%
Duration worked in healthcare			
<2 years		2	11.8%
2-4 years		0	0%
5-10 years		5	29.4%
11-20 years		5	29.4%
21-35 years		4	23.5%
>36 years		1	5.9%
Profession			
Nurse		14	82.4%
Social Worker		2	11.8%
Occupational Therapist		1	5.9%

Table 3: Experience and perceptions of technology.

	CALD community (n=12)		Healthcare staff (n=17)	
	<u>Median</u>	<u>Range</u>	<u>Median</u>	<u>Range</u>
Estimated use of smart technology (hours per week)	3.2; 6.1 (mean; SD)	0-20	24.4; 18.7 (mean; SD)	4-70
Ability to use smart technology (Likert scale 0-10 ^a)	3.0	0-7	8.0	5-10
Confidence using smart technology (Likert scale 0-10 ^b)	4.5	0-7	8.0	5-10

^a0= not confident at all, 10= completely confident; ^b0= not able to use, 10= very able to use.

Table 4: Appraisal of translation apps

	CALD community (n=12)		Healthcare staff (n=17)	
	<u>Median</u>	<u>Range</u>	<u>Median</u>	<u>Range</u>
Ease of using TalkToMe (Likert scale 0-10 ^a)	5.0	0-9	8.0	1-10
Ease of using CALD Assist (Likert scale 0-10 ^a)	4.5	0-10	9.0	7-10

Ease of using Google Translate™ (Likert scale 0-10 ^a)	5.0	0-10	7.5	4-10
Overall satisfaction with TalkToMe (Likert scale 0-5 ^b)	4.0	3-5	3.0	2-4
Overall satisfaction with CALD Assist (Likert scale 0-5 ^b)	4.0	3-4	4.0	3-5
Overall satisfaction with Google Translate™ (Likert scale 0-5 ^b)	3.5	3-5	3.5	2-5

^a0 = not easy to use, 10 = very easy to use; ^b0 = not satisfied at all, 5 = very highly satisfied

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