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A cross-sectional study exploring equity of access to telehealth in culturally and linguistically diverse communities in a major health service

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ABSTRACT

Objectives. The utilisation of telehealth among culturally and linguistically diverse communities in Australia remains unexplored. We aimed to describe telehealth (telephone and videoconference) utilisation within a major health service and identify sociodemographic factors that may contribute to limited telehealth access. **Methods.** A cross-sectional study was performed using service activity data from four metropolitan hospitals in Queensland, Australia. Outpatient department data (January to December 2021) were examined. These data included patients (N = 153 427) of all ages who had an outpatient appointment within 10 speciality services (i.e. Hepatology, Gastroenterology, Immunology and Psychology) that were the most frequent videoconference users. This study measured telehealth utilisation across the four tertiary hospitals and its association with sociodemographic factors. Descriptive statistics and regression analysis were used. Multivariate regression models were adjusted by sex, socioeconomic level and language use. **Results.** Overall, 39% of appointments were delivered through telehealth, with 65% of all reported telehealth services involving a telephone consultation. People who required interpreter services were 66% less likely to use telehealth services (OR adjusted 0.33, 95% CI 0.31–0.36, P < 0.05) than English-speaking people. Among those using telehealth, people requiring interpreter services were 13% less likely to use videoconference than phone (OR adjusted 0.87, 95% CI 0.77–0.98, P < 0.005). **Conclusion.** There is a gap in Australian telehealth service use for people with culturally diverse backgrounds and limited English proficiency. This study highlights a critical need to determine how people from culturally diverse backgrounds would like to engage with digital care options such as telehealth and the necessary support to enable this.

Keywords: culturally and linguistically diverse, digital divide, digital inclusion, equitable access, health disparities, health equity, language barriers, racial and ethnic minorities, telehealth.

Introduction

Telehealth provides a safe and clinically effective alternative to in-person facility-based health care.[1,2] However, the commonly reported benefits of telehealth (e.g. convenience, reduced travel time) are not fully realised for prioritised groups. Culturally and linguistically diverse (CALD) communities, defined as people born in a non-English speaking country and/or for whom English is not their first language,[3,4] face significant challenges accessing and navigating the Australian health system.[5,6] This is reflected in poorer health outcomes than communities with comparable health.[6,7] Barriers, such as language, lack of access to health information and living distances from healthcare facilities limit healthcare access, perpetuating diminished health outcomes for these groups.[8,9]

Different healthcare delivery options, such as synchronous telehealth, could reduce some barriers to CALD communities.[1,2] Telehealth is the delivery of care from a distance using technology, and for the sake of this research, it refers to synchronous communication over telephone or videoconference. Unfortunately, CALD communities are reported to be among the least likely telehealth users, and the evidenced benefits of telehealth are limited among these population groups.[7,10,11]

While CALD communities are not homogenous, they commonly experience language barriers, low health literacy, lack of access to technology and lack of support to use the technology[12] at higher rates, which result in additional barriers to telehealth access.[11–13] Unfortunately, the differences in telehealth access can also reinforce health and social inequities,[12,14,15] ultimately impacting health outcomes. Multiple strategies have been proposed to overcome these barriers and improve equity of access to care. Strategies include improving telehealth infrastructure,[15–17] integrating cultural competence into healthcare[18,19] and promoting digital health literacy among patients and providers.[17,18] Assuming these strategies are effective, we need data to accurately identify gaps in service access so that services and strategies can be targeted to the correct people.[15] This will then enable the design and implementation of tailored telehealth interventions to improve equitable access.[7,14,15]

In Australia, little is known about telehealth utilisation among CALD communities. Reports are mainly based on data-limited surveys providing descriptive overviews of the gaps without fully explaining the service activity across different health system levels.[20,21] Therefore, there is a need to accurately describe telehealth use, particularly among CALD communities. This study aimed to investigate telehealth utilisation and sociodemographic factors across CALD communities across a diverse health region in Queensland, Australia.

Methods

Study design and setting

This cross-sectional study used service activity data from the outpatient department of four tertiary hospitals in Queensland, Australia, from January 2021 to December 2021. This included metropolitan outpatient services from the Metro South Health Region (MSH): Princess Alexandra Hospital (PAH), Logan Hospital (LGH), Queen Elizabeth II Hospital (QEH) and Redland Hospital (RLH).

MSH serves a diverse community considered the most culturally diverse area in Queensland, with 20% of the population having a first language other than English.[22] MSH also serves a population with low socioeconomic status, high levels of disability and a significant Aboriginal and Torres Strait Islander community.[22] The diversity of the MSH population and the local technical support for service provision make this health region a suitable area to study access to telehealth services. We adopted the STROBE Statement Guideline for reporting observational studies.[23]

Data collection and sample

This study examined outpatient department appointment data stored in the scheduling platform Enterprise Scheduling Management (ESM).

We used data from the top 10 services with the highest videoconference use across MSH to ensure the feasibility of the study, including Hepatology, Pulmonary Rehabilitation, Gastroenterology, Immunology (including Allergy), Psychology (including Neuropsychology), Speech Pathology, Cardiothoracic Surgery, Rehabilitation Medicine and Cardiac Rehabilitation. Registries with missing data related to the variables of interest (listed below), such as telehealth use or the use of English as a first language, were excluded from the analyses.

Variable measures

This study considered telehealth use as an independent variable, including appointments provided via telephone and videoconference. Appointment characteristics included the month of the appointment, the facility where the appointment was provided, clinical service (reported a corporate clinical code) and appointment type (e.g. telephone new, telephone review, videoconference new, videoconference review). Patient characteristics included age (years), sex (male/female/indeterminate), country of birth, Aboriginal and Torres Strait Islander status, interpreter requirement (yes/no) and whether English was the first language (English/non-English). Recognising the multifaceted nature of CALD consumers, we simplified its various dimensions into three different categorial variables: (1) country of birth, (2) use of English as a first language and (3) need of interpreter. This approach facilitated the comprehension of the intricacies associated with CALD consumers accessing telehealth. It allowed us to mitigate potential confounding effects related to other sociodemographic factors or modalities of care. Provided postcodes were categorised into deciles using the Index of Relative Socioeconomic Disadvantage (IRSD) as described by the Australian Bureau of Statistics.[24] A lower score indicates that an area is at a relative disadvantage compared to an area with a higher score.[24] In order to capture a level of cultural and linguistic diversity in one variable, we created a composite variable combining both country of birth and whether English was a first language. Therefore, we recoded ‘country of birth’ into three categories: ‘Australia’ for those born in Australia; ‘not Australia, not prioritised’ for people born in countries other than Australia whose first language is English; and ‘not Australia, prioritised’ for people born in countries other than Australia whose first language is not English. Aboriginal and Torres Strait Islander status was examined as a separate variable to enable specific description

of Aboriginal and Torres Strait Islander peoples health service use (outside the scope of this study). Age was treated as a continuous variable. All other demographic variables were treated as either categorical or binary.

Statistical analyses

De-identified data from the electronic medical system were exported into a Microsoft Excel® CSV file and then imported into STATA® SE 17 for the statistical analyses. Chi-squared tests were used to compare telehealth use/non-use and its modalities (phone versus videoconference) with patient sociodemographic factors reported to influence telehealth use, such as age, sex, use of English, country of birth, the requirement of an interpreter, Aboriginal or Torres Strait Islander status and IRSD. Univariate and then multivariate logistic regression was conducted using a panel set to group patient events together. Odds ratios (OR) for the association of telehealth use and sociodemographic factors were set, with a 95% confidence interval (CI) and a significance cut-off level <0.05. Similar models were set to assess the association between telehealth modalities and sociodemographic factors. The final multivariate adjusted regression models were adjusted for age, sex, use of English, the requirement of an interpreter and IRSD.

Ethics

The Metro South Research Ethics Committee approved the study (HREC/2021/QMS/81523).

Results

Appointment characteristics

Our dataset included $N = 153\,427$ appointments conducted in 10 clinical services during the observation period (Table 1). PAH represented 66.50% ($n = 102\,029$) of the total number of observations included in this study (Table 1). Across the 10 clinical services included in the study, Gastroenterology contributed 45.19% of the appointments ($n = 69\,341$).

Patient characteristics

Patients had a mean age of 53 years (s.d. ± 17.61), with a similar distribution of males and females (49.80%/50.17%). Regarding place of birth, 62.73% ($n = 96\,249$) of patients were born in Australia, 15.19% ($n = 23\,299$) were born outside Australia in an English-speaking country and 22.08% ($n = 33\,878$) were born in countries whose first language was not English. Aboriginal and/or Torres Strait Islander peoples represented 4.10% (6218) of the total observations.

A total of 88.42% ($n = 132\,722$) used English as their first language, while 11.58% ($n = 17\,393$) used a language different from English. Only 6.09% ($n = 9163$) of the total sample were recorded as needing an interpreter for their appointments. The mean IRSD was 5.47 (s.d. = 2.89), indicating the population did not have a low socioeconomic background on average.

Summary of telehealth services

Telehealth accounted for 39.16% ($n = 60\,081$) of outpatient consultations conducted across all observations. The most common telehealth modality was the telephone (64.87%, $n = 38\,514$), followed by videoconference calls (35.13%, $n = 20\,857$). Across the different facilities, PAH used telehealth for 42.54% ($n = 43\,402$) of all consultations, followed by LGH with 28.27% ($n = 8389$), QEH with 42.42% ($n = 6424$) and RLH with 28.34% ($n = 1866$). Patients who used telehealth (52.35 years, s.d. = 17.97) were, on average, slightly younger than the ones not using telehealth (52.78 years, s.d. 17.05) (t-test $= -4.63$, $P < 0.0001$). There was no significant difference in telehealth use according to sex.

Telehealth use among CALD consumers

Among people not born in Australia and categorised as prioritised, telehealth use was 19.53% ($n = 11\,734$) compared to 64.54% ($n = 38\,775$) of telehealth use among patients born in Australia. Among the former, people who reported not using English and accessed telehealth represented 41.53% ($n = 4806$) of telehealth use among this group and 8.21% of the overall telehealth use. The frequency of telehealth use among the population born outside of Australia, not using English as their primary language and requiring interpreter services was 19.03% ($n = 1675$) of the total number of telehealth users ($\chi^2(1) = 1.70$, $P = 0.0001$). Among Aboriginal and Torres Strait Islander peoples, telehealth use was 37.86% ($n = 2354$) ($\chi^2(1) = 4.02$, $P = 0.04$). The level of socioeconomic disadvantage was slightly higher among telehealth users, with 5.72 (s.d. = 2.86), compared to the in-person appointments (5.31, s.d. = 2.89) (t-test $= -26.94$, $P < 0.0001$). While overall phone use was higher across all groups, stratified analyses per category showed different results. The proportion of use of videoconference among people born outside Australia in a prioritised country was significantly higher (41.10%, $n = 4785$, $\chi^2(2) = 227.56$, $P < 0.001$) compared to people born in Australia (33.79% $n = 12\,935$) and those born in a non-prioritised country (33.19%, $n = 3137$). Significant differences between groups were detected among those needing interpreter services (40.70%, $n = 689$, $P < 0.001$) and those not using English as a first language (46.43%, $n = 2330$, $P < 0.001$). A detailed description of these findings is provided in Supplementary Table S1.

Regression analysis

After fitting multivariate panel logistic regression models and adjusting for confounders, our analysis showed no evidence for an association between telehealth use and age (OR

Table 1. Sociodemographic characteristics of the Outpatient Department of Metro South Health from January 2021 to December 2021.

	Total (n = 153 427, 100%)[A]	Telehealth use (n = 60 081, 39.16%)[A]	In-person (n = 93 346, 60.84%)[A]	Chi-squared test (d.f.)	P-value
Age (mean (s.d.)), years	52.52 (17.61)	52.35 (17.97)	52.78 (17.05)	t test = −4.63	$P < 0.0001$
Sex (% (n))				$\chi^2(2) = 18.76$	$P < 0.0001$
Male	49.80% (76 406)	38.70% (29 569)	61.30% (46 837)		
Female	50.17% (76 977)	39.62% (30 502)	60.38% (46 475)		
Indeterminate	0.03% (44)	22.74% (10)	77.27% (34)		
	100% (153 427)				
Country of birth				$\chi^2(2) = 378.43$	$P < 0.0001$
Australia	62.73% (96 249)	40.29% (38 775)	59.71% (57 474)		
Not Australia, prioritised	22.08% (33 878)	34.64% (11 734)	65.36% (22 144)		
Not Australia, not prioritised	15.19% (23 299)	41.08% (9752)	58.92% (13 727)		
Aboriginal and Torres Strait Islander status	4.10% (6218)	37.86% (2354)	62.14% (3864)	$\chi^2(1) = 4.07$	$P < 0.0001$
Location				$\chi^2(3) = 2.4$	$P < 0.0001$
Princess Alexandra Hospital (PAH)	66.50% (102 029)	42.54% (43 402)	57.46% (58 627)		
Logan Hospital (LGH)	19.34% (29 670)	28.27% (8389)	71.73% (21 281)		
Queen Elizabeth II Hospital (QEH)	9.87% (15 144)	42.42% (6424)	57.58% (8720)		
Redland Hospital (RLH)	4.29% (6584)	28.34% (1866)	71.66% (4718)		
Clinical service				$\chi^2(9) = 1.1$	$P < 0.0001$
Gastroenterology	45.19% (69 341)	48.55% (33 668)	51.45% (35 673)		
Hepatology	21.16% (32 466)	35.91% (11 657)	64.09% (20 809)		
Rehabilitation	9.55% (14 646)	11.33% (1659)	88.67% (12 987)		
Speech Pathology	8.95% (13 726)	31.81% (4366)	68.19% (9360)		
Psychology	6.91% (10 608)	30.86% (3274)	69.14% (7334)		
Immunology General	2.35% (3610)	26.81% (968)	73.19% (2642)		
Immunology – Allergy	2.28% (3497)	25.97% (908)	74.03% (2589)		
Cardiac Surgery – Cardiothoracic	1.94% (2981)	22.91% (683)	77.09% (2298)		
Neuropsychology	1.10% (1693)	27.94% (473)	72.06% (1220)		
Cardiac Rehabilitation	0.56% (0.56)	48.89% (420)	51.11% (439)		
Use of English (as a first language)				$\chi^2(1) = 806.15$	$P < 0.0001$
English user	88.42% (132 722)	40.27% (53 467)	59.75% (79 305)		
Non-English user	11.58% (17 393)	29.10% (5062)	70.90% (12 331)		
Requirement of interpreter				$\chi^2(1) = 1.70$	$P < 0.0001$
Yes	6.09% (9163)	18.78% (1721)	81.22% (7442)		
No	93.91% (141 348)	40.35% (57 033)	59.65% (84 315)		
Level of socioeconomic disadvantage (mean, (s.d.))	5.47 (2.89)	5.72 (2.86)	5.31 (2.89)	t test = −26.94	$P < 0.0001$

[A]All values are rounded to two decimal places.

Table 2. Multivariate logistic regression model showing the factors associated with telehealth use among culturally and linguistically diverse consumers.

Characteristics (as predictors)	Telehealth use (as outcome)		
	Odds ratio	95% CI	*P*-value
Model 1[A]			
Country of birth (n = 150, 193)	(Australia as reference category)		
Prioritised, not Australia	0.77	(0.75–0.78)	$P < 0.0001$
Adjusted by need of interpreter	0.98	(0.95–1.00)	$P = 0.08$
Not prioritised, not Australia	1.01	(0.99–1.05)	$P = 0.32$
Age (years)	1.00	(1.00–1.06)	$P = 0.0001$
Level of socioeconomic disadvantage	1.05	(1.04–1.05)	$P = 0.001$
Sex	(Male as reference category)		
Female	1.04	(1.02–1.06)	$P < 0.0001$
Indeterminate	0.42	(0.21–0.85)	$P = 0.015$
Model 2[A]			
Use of English as a first language (n = 149, 489)	(English user as reference category)		
Non-English user	0.60	(0.58–0.62)	$P < 0.0001$
Adjusted by need of an interpreter and country of birth	0.34	(0.32–0.36)	$P < 0.0001$
Age (years)	1.00	(1.00–1.01)	$P < 0.0001$
Level of socioeconomic disadvantage	1.05	(1.04–1.05)	$P < 0.0001$
Sex	(Male as reference category)		
Female	1.05	(1.03–1.07)	$P < 0.0001$
Indeterminate	0.43	(0.21–0.88)	$P = 0.01$

[A]Regression models adjusted for sex, age and level of socioeconomic disadvantage. All values are rounded to two decimal places.

1.00, 95% CI 1.00–1.01, $P = 0.0001$) (Table 2). Telehealth use was weakly associated with sex, with females modestly more likely to use telehealth (OR 1.03, 95% CI 1.01–1.06, $P < 0.0001$).

People who reported not speaking English as a first language were 40% less likely to use telehealth (OR 0.61, 95% CI 0.58–0.62, $P < 0.0001$) than English speakers (Table 2 – Model 1). People born outside of Australia and who do not use English as a first language were 22% less likely to use telehealth (OR 0.77, 95% CI 0.75–0.79, $P < 0.0001$) (Table 2 – Model 1). In contrast, people born in English-speaking countries different from Australia did not differ from people born in Australia (OR 1.01, 95% CI 0.99–1.05, $P = 0.32$). Adjusted by country of birth, the multivariate model showed that people who reported not using English were 39% less likely to use telehealth (OR 0.62, 95% CI 0.59–0.65, $P < 0.0001$) (Table 2 – Model 2). People requiring interpreter services had 66% fewer occasions of telehealth services (OR 0.34, 95% CI 0.32–0.36, $P < 0.0001$) than those not requiring interpreter services (Table 2 – Model 2). This association did not vary after adjusting by their use of English or country of birth (OR 0.33, 95% CI 0.31–0.36, $P < 0.0001$). Among telehealth users, people requiring an interpreter were 13% less likely to use video-conference than phone (after adjusting for country of birth and use of English, OR 0.87, 95% CI 0.77–0.98, $P < 0.0001$) (Supplementary Table S2). People living in higher socio-economic areas were more likely to access telehealth (OR 1.05, 95% CI 1.04–1.05, $P < 0.0001$) (Table 2) and video-conferencing (OR 1.06, 95% CI 1.05–1.07, $P < 0.0001$) (Supplementary Table S2). However, people in the lowest decile of IRSD were 50% less likely to use telehealth (OR 0.49, 95% CI 0.48–0.50, $P < 0.0001$) compared to other categories in the same index.

Discussion

This is the first Australian study to describe the gap in telehealth access among CALD communities using health service activity data. Our primary finding was that telehealth is predominantly accessed by people who speak English as their first language and who do not require interpreter services during their health appointments. In comparison, CALD patients were two-thirds less likely to access telehealth services. Furthermore, consumers with multiple factors, including living in areas of low socioeconomic advantage, who speak a language other than English and require an interpreter, were the least likely to use telehealth. Given the rapid changes in population diversity,[7] migration patterns[25] and the expansion in telehealth,[26] these study's findings highlight the need to identify equity-based solutions to improve telehealth awareness and uptake among these populations.

Telehealth access significantly differs among those living in under-resourced settings. Consistent with previous research,[7,9,13,17,27] prioritised populations are less likely to be offered a telehealth service and more commonly referred for in-person appointments. Despite the positive perceptions and acceptance of telehealth among healthcare professionals and consumers,[28] cultural biases in telehealth remain an issue to address.[29] Irrespective of English language skills, in our study, people born in non-English speaking countries were 22% less likely to receive a telehealth service. These results align with current literature (primarily from the United States) regarding telehealth use.[13,27,30] While some in-person care is often required, hybrid approaches that include telehealth as an option can reduce access issues such as travel inconvenience and cost. Furthermore, a recent review described the positive impact of telehealth interventions on

health outcomes such as depression, hypertension, HIV and diabetes among CALD communities.[7] Further research is required to explore the dimensions of the equity gap in telehealth access. These studies could use participatory approaches to incorporate consumers' and health professionals' perspectives on current telehealth implementation and longitudinal data evaluating the impact of targeted telehealth interventions toward equitable access.

Our study shows significantly lower telehealth uptake among patients requiring interpreters. These low numbers are corroborated by studies assessing interpreter use and reporting the insufficient uptake, use of protocols and awareness of interpreter use in telehealth services.[27,31–33] Although the low amount of interpreter uptake found in our study could have biased our association away from the null, our analysis adjusted this factor for potential confounders such as country of birth, socioeconomic disadvantage level and English use. It also aligns with other studies,[11,19,27] exposing the urgent need to address cultural and language barriers in telehealth design and use. Using a retrospective cohort study, Cockrell *et al.*[34] described the importance of promoting interpreter use to improve satisfaction with telehealth provision and potentiate meaningful relationships with healthcare professionals. Furthermore, similar results can be found in in-person delivery of care.[35]

Our results align with national survey data conducted in Australia, reporting the predominant telephone use for delivering telehealth services.[21,26,36] In the Australian context, although Medicare was introduced for both videoconference and telephone, findings from national surveys reported low videoconference use, including CALD consumers (6.4%).[21,26] In contrast to survey data describing telehealth uptake at the primary care level, our results expose a gap in telehealth uptake across tertiary hospitals and among patients with greater health and social needs. Supporting infrastructure and health e-literacy could improve telehealth uptake across all health system levels and support equitable access.[17,18,37] For CALD consumers, facilitation of multiple users (i.e. interpreters or caregivers) to support telehealth interactions,[38] building trust in technology use and health providers[7] and acknowledging cultural diversity in all healthcare delivery settings[18,19] should be key strategies that clinicians and healthcare managers must consider

Strengths and limitations

A strength of our study is the large dataset (n = 153 427) from four different (geographically and socio-demographically) tertiary hospitals, which supports the transferability of our results.

Our study has important limitations worth noting. First, data from tertiary hospitals in Queensland may overrepresent telehealth use among patients with complex needs compared to the general population in other settings (e.g. primary care) or other Australian states. Fortunately, our results sufficiently expose the inequitable distribution of telehealth use among those who do not speak English as a first language or those living in low socioeconomic conditions. Second, this study is an observational snapshot in time and does not imply causation. Third, we assumed care was provided in English, the dominant language in Australia, but some informal translation could have occurred (e.g. bilingual staff or patients' care or family members) and our data cannot identify nor adjust for any such instance of this nature.

Conclusion

This study highlighted a substantial telehealth access gap among CALD patients. Contributing factors include not being a native English speaker, needing an interpreter and having a low socioeconomic background. Clinicians, healthcare managers and policymakers must consider these factors carefully and implement evidence-based strategies to ensure more equitable access to appropriate in-person and telehealth services care.

Supplementary material

Supplementary material is available online.

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Data availability. This cross-sectional study design used service activity data from the outpatient department of four tertiary hospitals in Queensland, Australia, from January 2021 to December 2021. This included metropolitan outpatient services from the Metro South Health Region (MSH): Princess Alexandra Hospital, Logan Hospital, Queen Elizabeth II Hospital and Redland Hospital. The data that support this study cannot be publicly shared due to ethical or privacy reasons and may be shared upon reasonable request to the corresponding author if appropriate.

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