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SHORT REPORT

Factors associated with virtual care access in older adults: a cross-sectional study

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Abstract

Background: virtual care has been critical during the COVID-19 pandemic, but there may be inequities in accessing different virtual modalities (i.e. telephone or videoconference).
Objective: to describe patient-specific factors associated with receiving different virtual care modalities.
Design: cross-sectional study.
Setting and Subjects: we reviewed medical records of all patients assessed virtually in the geriatric medicine clinic at St. Michael's Hospital, Toronto, Canada, between 17 March and 13 July 2020.
Methods: we derived adjusted odds ratios (OR), risk differences (RDs) and marginal and predicted probabilities, with 95% confidence intervals, from a multivariable logistic regression model, which tested the association between having a videoconference assessment (vs. telephone) and patient age, sex, computer ability, education, frailty (Clinical Frailty Scale score), history of cognitive impairment and immigration history; language of assessment and caregiver involvement in assessment.
Results: our study included 330 patients (227 telephone and 103 videoconference assessments). The median population age was 83 (Q1–Q3, 76–88) and 45.2% were male. Frailty (adjusted OR 0.62, 0.45–0.85; adjusted RD −0.08, −0.09 to −0.06) and absence of a caregiver (adjusted OR 0.12, 0.06–0.24; adjusted RD −0.35, −0.43 to −0.26) were associated with lower odds of videoconference assessment. Only 32 of 98 (32.7%) patients who independently use a computer participated in videoconference assessments.
Conclusions: older adults who are frail or lack a caregiver to attend assessments with them may not have equitable access to videoconference-based virtual care. Future research should evaluate interventions that support older adults in accessing videoconference assessments.

Keywords: caregiver, frailty, older people, telemedicine, virtual care

Key Points

- Older adults had lower odds of videoconference-based virtual care if they were frail or did not have a caregiver present.
- Older adults independent in using a computer may prefer to access virtual care by telephone as opposed to videoconference.
- Patient age and sex were not associated with receiving a videoconference as opposed to telephone-based assessment.

Introduction

Virtual care (i.e. videoconference or telephone) has rapidly expanded to meet patient needs and physical distancing guidelines during the COVID-19 pandemic [1–3]. Before the COVID-19 pandemic, virtual care was often used to provide medical care to older adults from rural and distant communities in Canada; however, it is now being used routinely in urban settings [1]. Although virtual care is a way for clinicians to continue caring for patients throughout the COVID-19 pandemic, certain factors (e.g. cognitive impairment, clinical frailty, social isolation, completion of less formal education) could prevent them from accessing videoconference-based virtual care [4]. Clinicians gain information from physical (e.g. gait assessment) and mental status examination (e.g. visuoconstructional drawing) components that are not readily assessable by telephone, but participating in videoconference assessments requires access to and knowledge of web-based technology (e.g. Zoom) [2]. Our objective was to identify patient-specific factors associated with accessing videoconference assessments, as opposed to telephone-based assessments, in a diverse population of older adults.

Methods

We obtained ethics approval for this study from the Unity Health Toronto Research Ethics Board.

Setting and data source

We retrospectively reviewed medical records of all patients who received at least one virtual assessment in the geriatric medicine clinic at St. Michael's Hospital, Toronto, Canada, between 17 March 2020 and 13 July 2020; 17 March 2020 was the first day that patients were seen virtually, as opposed to in-person, during the COVID-19 pandemic. The mode of virtual assessment (i.e. telephone or videoconference [Zoom]) was chosen by patients or their caregivers. Patients could access videoconference assessments via computer or other electronic device. The geriatric medicine clinic at St. Michael's Hospital serves a diverse inner-city population of older adults. All study data were extracted from patients' Cerner electronic medical records, which include comprehensive geriatric assessments and follow-up clinic notes.

Study design

We implemented a cross-sectional study design. We extracted these data from each patient's medical record: age, sex, modality of virtual care (i.e. telephone or videoconference), caregiver (i.e. family, friend or other) presence during assessment, language of assessment, highest level of education completed, birthplace, cognitive status, independence in completing basic activities of daily living (i.e. bathing, eating, ambulating, toileting and hygiene), independence in completing instrumental activities of daily living (i.e. shopping, housework, accounting, food preparation, transportation, medication administration and telephone and computer usage), symptomatic disease (e.g. dyspnea from heart failure) and frailty. We described frailty status with the Clinical Frailty Scale (CFS) [5]. Where the CFS score was not stated by treating geriatricians, patients were assigned a CFS score (by JAW [a geriatrician experienced in administering the CFS]) based on the described burden of symptomatic disease and impairments in basic and instrumental activities of daily living. Patients with mild cognitive impairment, dementia or vascular cognitive impairment were classified as having cognitive impairment [6,7].

Statistical analysis

We used a multivariable logistic regression model to test the association between having a videoconference assessment (vs. telephone assessment) and patient age, sex (male vs. female), education (post-secondary vs. high-school equivalent or less), CFS score, history of cognitive impairment (cognitive impairment vs. no cognitive impairment), immigration history (born in vs. immigrated to Canada), language of assessment (all languages other than English vs. English), caregiver involvement (absent vs. present) and ability to use a computer (independent vs. dependent). Based on our clinical experience and a review of the e-health literacy literature, we believed that these factors could impact patients' ability to access videoconference-based virtual care [8,9]. We included missing values for categorical variables as an additional category. There were no missing values for continuous variables. We presented associations as unadjusted odds ratios (ORs), adjusted ORs and adjusted risk differences (RDs) with 95% confidence intervals (CIs). We presented the following by caregiver presence or absence, (i) marginal probabilities of virtual assessment at representative values of the CFS (i.e. 3, 4, 5, 6 and 7) while allowing other variables to take observed sample values and (ii) predicted probabilities for an 80-year-old woman with CFS score 5 who immigrated to Canada, speaks English, attained a post-secondary education, does not have cognitive impairment and independently uses a computer [10–12]. We reported two-sided *P*-values and considered *P*-values <0.05 as statistically significant. We conducted analyses in STATA, version 15.1.

Results

We reviewed the medical records of 332 patients who were assessed virtually in the geriatric medicine clinic at St. Michael's Hospital. Two patients were excluded because they had delirium at the time of virtual assessment and we could not determine whether they had underlying cognitive

Table 1. Baseline characteristics of older adults receiving a telephone or videoconference assessment

	Telephone ($n = 227$)	Videoconference ($n = 103$)	*P*-value
Age (years), median (Q1–Q3)	83 (76 to 88)	84 (77 to 87)	0.70
Male sex, *n* (%)	105 (46.3)	44 (42.7)	0.55
Frailty (CFS), mean (SD)	5.1 (1.0)	4.9 (0.9)	0.14
Caregiver absent at assessment, *n* (%)	102 (44.9)	15 (14.6)	<0.01
Assessment in English, *n* (%)	198 (87.2)	89 (86.4)	0.84
Cognitive impairment, *n* (%)	186 (81.9)	78 (75.7)	0.19
Highest level of education completed			
Post-secondary, *n* (%)	137 (60.4)	58 (56.3)	0.77
High school or less, *n* (%)	83 (36.6)	42 (40.8)	
Missing, *n* (%)	7 (3.1)	3 (2.9)	
Immigration status			
Born in Canada, *n* (%)	93 (41.0)	41 (39.8)	0.36
Immigrated to Canada, *n* (%)	131 (57.7)	58 (56.3)	
Missing, *n* (%)	3 (1.3)	4 (3.9)	
Independence in using a computer			
Yes, *n* (%)	66 (29.1)	32 (31.1)	0.89
No, *n* (%)	42 (18.5)	20 (19.4)	
Missing, *n* (%)	119 (52.4)	51 (49.5)	

Abbreviations: Q1, first quartile; Q3, third quartile; *n*, number; SD, standard deviation

Table 2. Factors associated with videoconference versus telephone assessment

Factors	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted RD (95% CI)
Older age	1.00 (0.97–1.04)	1.00 (0.96–1.04)	0.00 (−0.01–0.01)
Male sex	0.87 (0.54–1.39)	0.77 (0.45–1.31)	−0.05 (−0.14–0.05)
Frailty	0.83 (0.66–1.06)	0.62 (0.45–0.85)	−0.08 (−0.09 to −0.06)
Post-secondary education	0.84 (0.52–1.35)	0.82 (0.47–1.43)	−0.04 (−0.14 to 0.07)
Born in Canada	1.00 (0.62–1.61)	1.01 (0.57–1.76)	0.00 (−0.10 to 0.10)
Cognitive impairment	0.69 (0.39–1.21)	0.57 (0.30–1.10)	−0.11 (−0.23 to 0.02)
Caregiver absent at assessment	0.21 (0.11–0.38)	0.12 (0.06–0.24)	−0.35 (−0.43 to −0.26)
Independence in using a computer	1.01 (0.52–2.01)	0.84 (0.36–1.94)	−0.03 (−0.19 to 0.13)
Assessment in English	0.93 (0.47–1.85)	1.24 (0.54–2.86)	0.04 (−0.11 to 0.18)

Abbreviations: CI, confidence interval; OR, odds ratio; RD, risk difference.

impairment. Therefore, we included 330 patients in our study population. Among patients receiving a telephone-based assessment (number[*n*] = 227), the median age was 83 (Q1–Q3, 76–88), 46.3% ($n = 105$) were male and caregivers were absent for 44.9% ($n = 102$) of assessments (Table 1). Among patients receiving a videoconference (i.e. Zoom) assessment ($n = 103$), the median age was 84 (Q1–Q3, 77–87), 42.7% ($n = 44$) were male and caregivers were absent for 44.9% ($n = 102$) of assessments (Table 1). Only 32 of 98 (32.7%) patients who could independently use a computer participated in videoconference assessments.

Patients with frailty (adjusted OR 0.62, 0.45 to 0.85; adjusted RD -0.08, −0.09 to −0.06) or who did not have a caregiver present at their virtual assessment (adjusted OR 0.12, 0.06 to 0.24; adjusted RD -0.35, −0.43 to −0.26) had significantly lower odds of receiving a videoconference compared with telephone assessment (Table 2). There were no significant differences in age, sex, level of education, immigration status, history of cognitive impairment, language of assessment or ability to use a computer between videoconference and telephone assessment groups (Table 2). Data pertaining to independence in using a computer were missing for 52.4% ($n = 119$) of persons receiving a telephone assessment and 49.5% ($n = 51$) of persons receiving a videoconference assessment (Table 1).

If a patient did not have a caregiver present at the virtual assessment, the predicted probability of receiving a videoconference compared with telephone assessment was less than 50%, regardless of frailty status, ability to use a computer, or history of cognitive impairment (Supplementary Figures 1–3). The predicted probability of receiving a videoconference compared with telephone assessment for an 80-year-old woman with a CFS score of 5 who immigrated to Canada, speaks English, attained a post-secondary education, does not have cognitive impairment and independently uses a computer was 60% (39–80%) if a caregiver was present; however, her predicted probability of receiving a videoconference assessment decreased to 15% (3–26%) if a caregiver was absent.

Discussion

In this cross-sectional study of older adults assessed virtually in a geriatric medicine clinic during the COVID-19 pandemic, we found that frailty and the absence of a caregiver at virtual assessments were associated with significantly lower

odds of receiving a videoconference compared with the telephone-based assessment. Our results suggest that some older adults may lack equitable access to certain forms of virtual care.

Our results build upon growing literature suggesting that (i) older adults may be less likely to access videoconference compared with telephone assessments and (ii) factors unique to older adults might be important in understanding barriers to accessing videoconference-based virtual care [13]. Within the Oxford Royal College of General Practitioners Research and Surveillance Centre, 55.1% of geriatric medicine appointments occurred over the telephone by week 14 of the COVID-19 pandemic; whereas only 1.5% of these appointments occurred by videoconference [14]. In Northern Finland, a population-based survey of older adults conducted before the COVID-19 pandemic found that frail older adults were less likely to use the internet or other communication technologies, including Skype, suggesting that frailty might be contributing to this lower use of videoconference assessments [4]. In the USA, findings from the 2018 National Health and Aging Trends Study suggested that 38% of older adults were not ready for videoconference assessments, predominantly because of their inexperience with technology [13]. Future research should focus on how caregivers and clinicians can support older adults in accessing videoconference-based virtual care and comparing the quality of care received when assessments are completed by telephone, videoconference or in-person.

Our study had limitations. Data describing independence in using a computer were missing for 51.5% of patients. However, the proportion of missing data across virtual assessment groups (i.e. telephone or videoconference) was balanced and we accounted for these missing data in our analysis by creating an additional category for missing data (i.e. independent, dependent or unknown). Our study did not focus on patients who could not access virtual assessments; therefore, our study does not describe other potentially important factors, such as hearing impairment, which could make any form of virtual assessment more difficult.

As the COVID-19 pandemic evolves, we need to better support older adults in accessing videoconference-based virtual care. Older adults may benefit from a caregiver's support to facilitate access to videoconference-based assessments, paving the way for initiatives that increase the involvement of patients' loved ones or volunteers. Future research should aim to implement and evaluate interventions that support older adults in having equal access to all virtual care modalities.

Supplementary Data: Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

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References

1. Hardcastle L, Ogbogu U. Virtual care: enhancing access or harming care? Healthc Manage Forum 2020; 33: 840470420938818.
2. Wosik J, Fudim M, Cameron B *et al.* Telehealth transformation: COVID-19 and the rise of virtual care. J Am Med Inform Assoc 2020; 27: 957–62.
3. Force VCT. Virtual Care: Recommendations for Scaling Up Virtual Medical Services, 2020.
4. Keränen NS, Kangas M, Immonen M *et al.* Use of information and communication technologies among older people with and without frailty: a population-based survey. J Med Internet Res 2017; 19: e29.
5. Rockwood K, Song X, MacKnight C *et al.* A global clinical measure of fitness and frailty in elderly people. CMAJ 2005; 173: 489–95.
6. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. Arlington, VA: American Psychiatric Association, 2013.
7. O'Brien JT, Erkinjuntti T, Reisberg B *et al.* Vascular cognitive impairment. Lancet Neurol 2003; 2: 89–98.
8. Roque NA, Boot WR. A new tool for assessing mobile device proficiency in older adults: the mobile device proficiency questionnaire. J Appl Gerontol 2018; 37: 131–56.
9. Sudbury-Riley L, FitzPatrick M, Schulz PJ. Exploring the measurement properties of the eHealth literacy scale (eHEALS) among baby boomers: a multinational test of measurement invariance. J Med Internet Res 2017; 19: e53.
10. Williams R. Using the margins command to estimate and interpret adjusted predictions and marginal effects. The Stata Journal 2018; 12: 308–31.
11. Norton EC, Dowd BE, Maciejewski ML. Marginal effects-quantifying the effect of changes in risk factors in logistic regression models. JAMA 2019; 321: 1304–5.
12. Hammer MJ, Kalkan KO. Behind the curve: clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models. Am J Polit Sci 2012; 57: 263–77.
13. Lam K, Lu AD, Shi Y, Covinsky KE. Assessing telemedicine unreadiness among older adults in the United States during the COVID-19 pandemic. JAMA Intern Med 2020; 180: 1389–91.
14. Joy M, McGagh D, Jones N *et al.* Reorganisation of primary care for older adults during COVID-19: a cross-sectional database study in the UK. Br J Gen Pract 2020; 70: e540–7.

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