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Virtual primary care for people living with dementia in Canada: cross-sectional surveys of patients, care partners, and family physicians

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Abstract

Background Virtual care (VC) for dementia in primary care settings is an important aspect of healthcare delivery in Canada. However, the evidence informing optimal and sustainable provision of VC for persons living with dementia (PLWD) and their care partners is scarce. The objectives of this study were to (1) describe the frequency of VC use, (2) identify characteristics of PLWD, care partners, and family physicians (FPs) that are associated with the use of VC, and (3) explore FPs' perceptions of barriers and facilitators to provide VC for PLWD and their care partners.

Methods The Alzheimer Society of Canada and College of Family Physicians of Canada conducted three nationwide cross-sectional surveys between October 2020 and April 2021: (1) One with PLWD, (2) one with care partners of PLWD, and (3) one with FPs. Virtual care was defined as two-way synchronous communication by telephone and/or a web camera. The prevalence of VC use among FPs, PLWD, and care partners was described. Logistic regression models were used to determine characteristics of participants (sociodemographic, urbanicity, frequency and availability of support for connecting with FPs, and FPs' practice characteristics) associated with any VC use (phone and/or video). Inductive thematic analysis of open-ended questions explored FPs' perceptions.

Results 131 PLWD, 341 care partners, and 125 FPs participated. 61.2% of PLWD, 59.5% of care partners, and 77.4% of FPs reported using VC. The models for PLWD (included age and ethnicity) and care partners (included gender/sex, urbanicity, and receiving support from a family member/friend to connect with FP) were inconclusive. FPs with > 20 years in practice were less likely to provide VC (OR = 0.23, 95%CI: 0.08–0.62, $p < 0.01$). FPs perceived that preferences regarding virtual vs. in-person care, office/family support, technology and family presence, and remuneration for FPs influenced VC use.

Conclusions Virtual primary dementia care uptake in Canada is substantial and mainly performed via telephone. According to FPs, physician-patient-caregiver partnerships and infrastructure for VC play key roles in using VC. Virtual care could facilitate access to primary care and minimize potential disruptions to in-person care for PLWD. Outcomes of virtual primary care for dementia need further investigation.

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Keywords Virtual care, People living with dementia, Care partner, Primary care, Family physician, COVID-19

Background

Dementia is associated with a higher burden of comorbidities, higher healthcare utilization, and worse clinical outcomes compared to patients without dementia [1]. Persons living with dementia (PLWD) require assistance from diverse stakeholders, such as care partners, family physicians (FPs), nurses, social workers, day hospitals, home care services, and community organizations to stay in their homes [2].

Accessing in-person care for ongoing follow-up and management may become challenging due to declining mobility, increasing disorientation with schedule changes, worsening neuropsychiatric symptoms and an increasing reliance on care partners [3]. Although barriers exist to providing comprehensive dementia care (e.g., managing neuropsychiatric symptoms of dementia [4], accessing and communicating with specialists [5], networking with social service agencies [6], poor confidence in ability to diagnose dementia [7], or time and reimbursement constraints [4]), FPs have been rapidly adapting to the need for close follow-up which includes implementing virtual care (VC) [8]. Virtual care herein was defined as care provided by the primary care practice that involves a FP, a nurse, or any other healthcare professional on the clinical team, via two-way synchronous communication using a telephone and/or a web camera (videoconference) [9].

In February 2020, only 4% of FPs in Canada provided video visits to the general population [9]. As a result of the pandemic, by June 2020, virtual visits increased from 4 to 70% of the ambulatory care provided by hospitals and physicians' offices across the country [9]. Virtual care became vital during the early stages of the COVID-19 pandemic when in-person visits were restricted to emergencies and SARS-CoV-2 vaccines were not yet readily available [10]. Virtual care could be a feasible approach to assist individuals with dementia [11], and it is widely accepted by families [12]. It facilitates connections between PLWD, their family, and their service providers, while reducing complications related to travel (e.g., difficulty moving, traffic, distance, and disorientation due to unfamiliar settings) [13].

The evidence on the effectiveness of VC in primary care settings on outcomes is uncertain. Among PLWD in senior living communities, having access to VC was found to be associated with ¼ reduction in emergency department visits [14]. A systematic review examining the impact of VC on health outcomes in PLWD in rural areas found that studies used a variety of cognitive tests and reported mixed results regarding the differences in patient performance when assessed in-person as compared to virtual consultation [15]. Such mixed evidence may be related to special challenges that can occur during VC for PLWD who also frequently have hearing, visual, and functional impairments [16, 17]. To inform optimal and sustainable provision of virtual primary dementia care in the Canadian context, an understanding of the status of VC uptake is needed from the perspective of PLWD, their care partners, and FPs.

This study aimed to answer the following questions: What percentage of PLWD, care partners, and FPs use VC in Canada, and which factors influence this use? The specific objectives were to (1) describe the frequency of use of VC, (2) identify characteristics of PLWD, care partners, and FPs that are associated with the use of VC, and (3) explore FPs' perceptions of facilitators of and barriers to provide VC for PLWD and their care partners.

Methods

This cross-sectional analytic study stemmed from a partnership between the Alzheimer Society of Canada (ASC) and the College of Family Physicians of Canada (CFPC), in collaboration with McGill University and Baycrest Health Sciences. We performed an analysis of the three nationwide surveys that were conducted with PLWD who resided primarily in the community, their care partners, and FPs across Canada during a period following the onset of the COVID-19 pandemic. The survey was launched in October 2020 and ended in April 2021.

Design of the surveys

Three survey questionnaires were developed by the ASC and CFPC in collaboration with PLWD and care partners: (1) one for PLWD (if needed, care partners were able to support PLWD in their responses), (2) one for care partners of PLWD, and (3) one for FPs. The original aim of the surveys was to assess the needs of physicians and PLWD and their care partners in their primary care relationship so as to develop effective practice tools to support FPs providing dementia care. The questionnaires were pilot tested, and their face validity was verified by the ASC and the CFPC for their respective questionnaires.

The ASC conducted surveys with PLWD and care partners and included closed and open-ended questions, including sociodemographic questions (e.g., age range, gender/sex, ethnic background, location) and questions focused on experiences with FPs during their health care journey (e.g., access to a FP, positive and negative feedback, perspectives on what strengths/gaps exist in their current care, and their experience with the care and support they received). The CFPC survey for FPs included sociodemographic questions (e.g., gender/sex, years of practice, type of practice) and focused on FPs' challenges with dementia care, gaps in their education or knowledge of dementia, tools that they find helpful in caring for PLWD and their care partners, and their perspectives on what new tools would be the most helpful going forward.

For this article, we performed the analyses of the data pertaining to the questions related to experiences with VC and sociodemographic variables. Selected closed-ended and open-ended questions were provided in Supplemental file 1.

Sample

To be eligible, PLWD had to self-identify as having a formal diagnosis of dementia, having a FP, and being able to answer the surveys independently or with the assistance of a care partner in one of four languages (English, French, Chinese, and Hindi). In cases where PLWD were not able to complete the survey, proxy care partners self-identifying as being a care partner of someone living with dementia were invited to complete surveys with/on behalf of the PLWD. Eligible care partners were also invited to complete an independent survey for themselves. Using both passive and active outreach approaches, the ASC reached 476 PLWD and care partners nationwide through its programs and services delivery, online communication channels (e.g., website, social media), targeted outreach to newcomer and immigrant service organizations, and via nationwide Alzheimer Society provincial chapters. The online survey, through the SurveyMonkey platform, was available via the ASC website and shared through the channels across the provincial Alzheimer Societies. Paper surveys were downloadable along with the informed consent forms via the ASC website, or could be mailed upon request, accompanied with a prepaid return envelope. An informed consent form accessible in simple language was developed for PLWD. If the PLWD could not consent, the informed consent was obtained from the care partner.

All FPs who were registered with the CFPC and who were members of one of the CFPC Member Interest Group Sections (e.g., Chronic Pain, Mental Health, Health Care of the Elderly, Hospital Medicine) were sent an invitation to participate in an online survey using the SurveyGizmo platform. In total, approximately 11,000 CFPC members were invited. A link to participate in the survey was also independently sent, with reminders, to the Black Physicians of Ontario Group and the Rural Physicians of Canada group, to attempt to increase the diversity of responses. Two additional reminders were sent to FPs to complete the survey. Informed consent was obtained from all the physicians who participated in the survey.

Institutional review board approval and reporting guidelines

The project was approved by the Baycrest Research Ethics Board and McGill Institutional Review Board. All methods were performed following relevant guidelines and regulations. This paper adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies [18].

Analyses

Quantitative analysis of closed-ended questions

Characteristics of participants were shown via descriptive analyses. For logistic regression analysis, PLWD and care partners were dichotomized based on gender/sex (female/woman vs. male/man), age (< 75 vs. 75 + and < 60 vs. 60+, respectively), ethnicity (white vs. non-white), urbanicity (large population centre size with > 100,000 vs. medium/small/rural population with ≤ 100,000) [19], frequency of meetings with the FP (at least once every 3 months vs. less frequently or unknown), and how they were supported in connecting with the FP (from a family member or friend vs. from clinic/other source or no support). Family physicians were dichotomized based on gender/sex (female/woman vs. male/man), ethnicity, urbanicity, years of practice (≤ 20 vs. > 20), and designation as a FP with a Certificate of Added Competence (CAC) in Care of the Elderly from the CFPC (yes vs. no). Family physicians were further categorized based on their attachment to any of the following five types of practice: solo, community-based team (essentially providing routine, front-line health and social services including home care to the people of the territory they serve, e.g., local community service centres [20]), interprofessional team (a group of family doctors who work together and in close collaboration with other health and social services professionals such as nurses and social workers to deliver comprehensive care, e.g., family medicine groups [21] or family health team [22]), teaching, or any other type of practice.

To describe the use of VC, binary (yes/no) outcomes of interest were created. Among PLWD and care partners, 'any VC user' were defined as those who said "Yes, and I am (we're) already using it" and specified the types of VC they used. Among FPs, "any VC providers" were defined as those who reported providing VC via phone or video (Zoom, FaceTime, Skype etc.) calls for PLWD and their care partners. Electronic mail and text messages were not within our scope as they were one-way communication and not widely provided by FPs.

To identify characteristics of PLWD, care partners, and FPs associated with the use of VC, logistic regressions [23] were modeled on the outcomes of interest using the characteristics of participant subgroups described above. A minimum of 10 Events Per Variable (EPV) criterion [24] (EPV is the number of events in the smaller of two outcome groups relative to the number of regression coefficients estimated excluding intercept) was originally suggested for logistic regression. However, it was later demonstrated that the current evidence supporting EPV rules for binary logistic regression was weak and that there was no rationale for this criterion [25, 26]. Our samples were therefore considered to be sufficient due to the exploratory (i.e., not hypothesis driven) [27] nature of our analysis. We chose the Akaike Information Criterion (AIC) as the measure of model fit. We performed the best subset strategy (i.e., every combination of the potential predictor variables), fforward selection (testing the addition of each variable), and backward selection (testing deletion of each variable), where a lower value of AIC corresponded to a better model fit. To test the power of the model fit, we used an area under the receiver operating characteristic curve (AUC), a measure of how well the model can discriminate those who do and do not have the outcome of interest [excellent (0.9-1), good (0.8–0.9), fair (0.7–0.8), poor (0.6–0.7), failed (0.5–0.6)] [28]. To test the goodness of fit, i.e., how well or rather how badly the model fitted the data, we used Pearson residuals. We compared this test statistic to the Chi-square table and obtained a p-value, where high p-values (above the usual threshold of 0.05) show that the model was adequate. R statistical software version 4.0 was used [29].

We conducted a sensitivity analysis to explore descriptive differences in responses between PLWDs who completed the survey themselves versus the PLWD surveys that were completed by a care partner.

Qualitative analysis of open-ended questions

To explore FPs' perceptions of barriers and facilitators to providing VC for patients with dementia and their care partners, an inductive thematic analysis [30] was conducted on FPs' responses to the four open-ended questions. Questions to explore facilitators included: "What strategies have enabled your successful implementation of VC for patients with dementia and their caregivers?" and "Please describe the enabling factors that have allowed you to offer VC successfully during the coronavirus pandemic". Questions to explore barriers included: "Please describe the barriers that have prevented you from providing VC to your patients with dementia and their caregivers" and "Please describe the barriers that will prevent you from continuing to provide VC". Responses were extracted into an Excel worksheet where the data were managed during the analysis. The analysis allowed for themes to emerge from the data using inductive coding [31] through comparisons within each participant response and between different participants. One co-author performed the initial coding, developed themes, and linked them to the original verbatim quotes. PLWD and care partner surveys did not include open-ended questions on VC. In our study, the decision to use a single coder for thematic analysis was based on the limited number of responses in the open-ended survey, allowing for a manageable and in-depth analysis by one researcher. Given the small dataset, the risk of bias was minimized through frequent consultations with other team members to review and validate coding decisions. This approach ensured consistency and rigor while making efficient use of available resources.

Results

Participation

Figure 1 shows the participation in the surveys. The PLWD survey was completed by 131 participants (76 questionnaires were completed by proxies on behalf of PLWD). The care partner sample included 341 participants, including 259 (76%) spouses or adult children, 62 (18%) other family members, and 20 (6%) friends or hired care partners. 125 FPs completed the survey. Table 1 presents the characteristics of the three groups of participants.

Virtual care use

129 PLWD (2 missing), 326 care partners (15 missing), and 124 FPs (1 missing) completed questions related to VC use. Among these completers, 79 (61.2%) PLWD, 194 (59.5%) care partners, and 96 (77.4%) FPs were identified as VC users. While most participants used the phone, 18 (14%) PLWD, 33 (10%) care partners, and 48 (39%) FPs used video either alone or along with the phone. The sensitivity analysis of the PLWD survey by respondent type showed similar results among PLWD and care partner responses. Twenty-two (17%) PLWD were offered video care (2 alone or 20 with the phone), among which 2 did not know how it worked and 2 were not interested in using it. Among 38 (11%) caregivers who reported being offered video calls, (6 alone or 32 with the phone), 4 did not know how it worked and 1 was not interested in using it. Table 2 shows the prevalence of VC use among the three stakeholders.

Characteristics of users determining virtual care use

For this specific analysis, we performed complete case analyses [32] as there were some missing responses, mostly to demographic questions which were towards the end of the surveys. It was possible that some participants stopped filling out the survey at some point before the demographic questions or chose not to respond to them as they were not made mandatory. Table 3 presents the results of the logistic regression analyses.

Among PLWD and care partners, models for VC outcomes were inconclusive (AUC was 0.61 and 0.58,

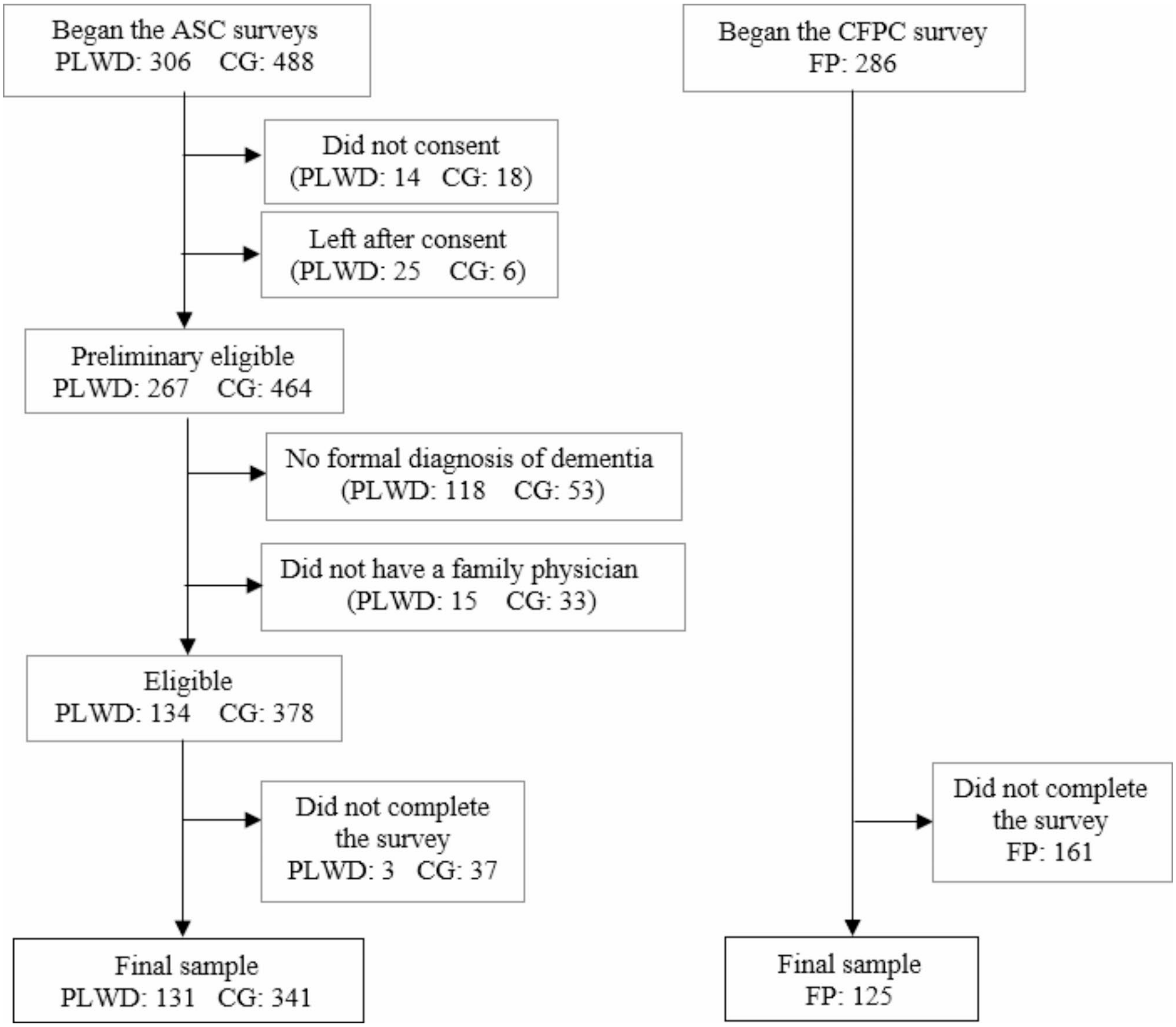

Fig. 1 Flow Chart Participation

respectively). Among FPs, the odds of providing VC were 77% lower for FPs who had > 20 years of practice compared to those who had 20 years or less (AUC = 0.68, almost fair). Pearson Chi-square tests were insignificant for all models, showing the adequacy of model fits.

Family physicians' perceptions of facilitators and barriers of virtual care

In total, 97 FPs responded to one or more open-ended questions. Themes were organized at four stages of virtual primary care provision: Decision-making for providing virtual vs. in person care; Preparation for virtual care once an appointment made; Execution of virtual care, and Physician compensation for virtual care provision. Table 4 outlines facilitators and barriers at these four stages, their definitions, and supporting quotes. Care preferences at the decision stage, office/family support at the preparation stage, good technology and family presence at the execution stage, and appropriate remuneration at the compensation stage were the most recurring factors affecting an appropriate mix of virtual and direct care, without abandoning direct care/visits.

Discussion

In this study, we described VC provided by FPs for PLWD in Canada from the perspectives of PLWD, care partners, and FPs. In general, VC uptake was about 60% among both PLWD and care partners, and this was mostly by telephone. Three fourths of FPs reported providing VC, and FPs with > 20 years of practice were less keen to provide it. Family physicians perceive that optimal and sustainable VC provision for dementia requires

Table 1 Descriptive characteristics of PLWD, Care partners and family physicians

Alzheimer Society of Canada Surveys Variable *n* (%)	**PLWD (*n* = 131)**	**Care Partners (*n* = 341)**	**College of Family Physicians of Canada Survey Variable *n* (%)**	**Family Physicians (*n* = 125)**
Female/Woman	77 (58.7)	264 (81.2)	**Female\Woman**	73 (67.0)
Missing	-	2	Missing	16
PLWD age [Care partners age]				
< 65 [< 50]	21 (16.0)	54 (16.6)	**Ethnicity**	
65–74 [50–59]	43 (32.8)	88 (27.1)	White	81 (75.7)
75–84 [60–69]	39 (29.8)	88 (27.1)	Black	2 (1.9)
85+ [70+]	28 (21.4)	95 (29.2)	East Asian	7 (6.5)
Missing	-	16	Indo Caribbean	1 (0.9)
Ethnicity			Latin American	1 (0.9)
White	97 (74.0)	250 (75.5)	Middle Eastern	3 (2.8)
African	3 (2.3)	5 (1.5)	South Asian	10 (9.3)
Black	4 (3.1)	17 (5.1)	Southeast Asian	1 (0.9)
Caribbean	6 (4.6)	12 (3.6)	Sudanese	1 (0.9)
East Asian	4 (3.1)	8 (2.4)	Missing[a]	18
Indigenous Peoples	6 (4.5)	6 (1.8)		
Latin	3 (2.3)	1 (0.3)	**Province**	
Mixed	2 (1.5)	3 (0.9)	Ontario	46 (47.4)
Pacific Islander	4 (3.1)	2 (0.6)	Quebec	8 (8.2)
South Asian	-	8 (2.4)	Nova Scotia	1 (1.0)
Southeast Asian	2 (1.5)	3 (0.9)	Newfoundland and Labrador	1 (1.0)
Missing[a]	-	10	Alberta	12 (12.4)
Province			British Colombia	5 (5.2)
Ontario	54 (41.2)	152 (46.9)	Saskatchewan	24 (24.7)
Quebec	18 (13.7)	29 (9.0)	Missing	28
Nova Scotia	6 (4.6)	11 (3.4)		
New Brunswick	5 (3.8)	15 (4.6)	**Urbanicity (population)**	
Prince Edward Island	2 (1.5)	3 (0.9)	Large (> 100,000)	81 (73.0)
Newfoundland and Labrador	-	1 (0.3)	Medium (30,000–100,000)	9 (8.1)
Alberta	10 (7.6)	32 (9.9)	Small (1,000–30,000)	17 (15.3)
British Colombia	16 (12.3)	23 (7.1)	Rural (< 1,000)	4 (3.6)
Saskatchewan	13 (9.9)	32 (9.9)	Missing	14
Manitoba	4 (3.1)	23 (7.1)		
Nunavut	1 (0.8)	-	**Years of family medicine practice**	
Yukon	2 (1.5)	1 (0.3)	0 to 5	25 (22.5)
Northwest Territories	-	2 (0.6)	2 to 10	12 (10.8)
Missing	-	17	11 to 20	22 (19.8)
Rurality			21 to 30	21 (18.9)
Large (> 100,000)	77 (59.2)	178 (55.8)	More than 30	31 (27.9)
Medium (30,000–100,000)	20 (15.4)	63 (19.7)	Missing	14
Small (1,000–30,000)	20 (15.4)	50 (15.7)	**Type of practice (may have > 1)**	
Rural (< 1,000)	13 (10.0)	28 (8.8)	Solo	18 (16.3)
Missing	1	22	Community-based team	58 (52.7)
Frequency seeing family physician			Interprofessional team	41 (37.3)
Once per month	9 (6.9)	40 (11.7)	Teaching	26 (23.6)
Once every three months	30 (22.9)	80 (23.5)	Other[b]	11 (10.0)
Once every six months	36 (27.5)	75 (22.0)	Missing	15
Once per year	18 (13.7)	55 (16.1)	**Type of practice (mutually exclusive)**	
Less than once per year	31 (23.7)	91 (26.7)	Only community-based team	39 (37.9)
Don't know	7 (5.3)	-	Only interprofessional team	20 (19.4)
Receiving support to connect family physician			Only solo	11 (10.7)
Yes, support from a family member/friend/caregiver	86 (65.7)	221 (64.8)	Only teaching	6 (4.9)

Table 1 (continued)

Alzheimer Society of Canada Surveys Variable *n* (%)	PLWD (*n* = 131)	Care Partners (*n* = 341)	College of Family Physicians of Canada Survey Variable *n* (%)	Family Physicians (*n* = 125)
Yes, support from the doctor's office	11 (8.4)	29 (8.5)	Mixed practice	23 (23.3)
Have support from another source	11 (8.4)	27 (7.9)	Other	4 (3.9)
No, and already asked for support	5 (3.8)	16 (4.7)		
No, but don't need support	18 (13.7)	29 (8.5)	**Training in Care of Elderly**	22 (19.8)
Don't know	-	19 (5.6)	Missing	14

PLWD: People living with dementia. [a] Missing may include "unsure" or "prefer not to say". [b] Team based hospitalist, Tertiary mental health facility for older adults, Nursing home, Focused practice Care of Elderly (2), Community and hospital based (2), Continuing Care, Hospital clinic, In-patient consultation service, Private practice Occupational Therapist

Table 2 Prevalence of virtual care use in PLWD, Care partners and Family Physicians

Variable *n* (%)	PLWD			Care partner (*N* = 341)
	All (*N* = 131)	Completed by PLWDs (*N* = 55)	Completed by proxies (*N* = 76)	
Receiving virtual care				
Yes, and I'm (we're) already using it	81 (61.8)	38 (69.1)	43 (56.6)	209 (61.3)
Yes, but I'm (we're) not interested	15 (11.5)	6 (10.9)	9 (11.8)	16 (4.7)
Yes, but I (we) don't know how it works	8 (6.1)	3 (5.5)	5 (6.6)	10 (2.9)
No, and I (we) don't want this service	5 (3.8)	1 (1.8)	4 (5.3)	32 (9.4)
No, but I (we) would like this service	7 (5.3)	1 (1.8)	6 (7.9)	25 (7.3)
Don't know	15 (11.5)	6 (10.9)	9 (11.8)	49 (14.4)
Type of virtual care used[a]				
Any virtual care (phone and/or video)	79 (61.2)	38 (69.1)	41 (55.4)	194 (59.5)
Only phone	61 (47.2)	29 (52.7)	32 (43.2)	161 (47.2)
Only video	2 (1.6)	1 (1.8)	1 (1.4)	5 (1.5)
Combination of phone and video	16 (12.4)	8 (14.5)	8 (10.8)	28 (8.5)
Missing/Don't know what type of virtual care	2	-	2	15
	Family Physicians (*N* = 125)			
Providing virtual care				
Providing any type of virtual care for all patients	109 (87.2)			
Providing any type of virtual care for PLWD	96 (77.4)			
Will keep using virtual care for PLWD after the COVID-19 pandemic	92 (74.2)			
Missing	1			
Type of virtual care provided for PWLD				
Any virtual care (phone or video)	96 (77.4)			
Only phone	48 (38.7)			
Only video	2 (1.6)			
Combination of phone and video	46 (37.1)			
Missing	1			

PLWD: A person living with dementia, consenting to and completing the survey on own behalf

Proxy: A caregiver, family member, or other decision-maker consenting to and completing the survey on behalf of the person living with dementia

[a] Of those who said "Yes, and I am (we're) already using it" and specified it

shared decision-making for VC vs. in-person care between PLWD, care partners, and their FPs, technical and administrative support for organization and execution of VC, and compensating physicians' time appropriately for the VC they provide.

Both PLWD's and care partners' reported use of any VC was relatively high, approximately 60%. However, associations between PLWD and care partner characteristics and VC use were inconclusive. This finding might be related to the first phase of the pandemic where virtual visits were provider-driven as opposed to being a choice

Table 3 Characteristics of participants associated with the use of virtual care (phone and/or video)

	Univariate		**Multiple**	
Factors	**OR**	**[95% CI]**	**OR**	**[95% CI]**
a. Persons living with dementia (*n* = 129) [2 no response]	**Phone and/or video users (*n* = 79)**			
Sociodemographic				
Female/woman	0.81	[0.39; 1.66]	NI	
Aged 75+	0.61	[0.29; 1.23]	0.527	[0.24;1.11]
White	1.72	[0.77; 3.84]	2.05	[0.88; 4.85]
Rurality				
Large population (> 100,000)	1.19	[0.58; 2.45]	NI	
Seeing family physician (FP)				
Frequency seeing FP at least once every three months	0.75	[0.35; 1.62]	NI	
Receiving support from a family member or friend to connect to FP	1.4	[0.66; 2.96]	NI	
b. Caregivers (*n* = 326) [15 no response]	**Phone or video users (*n* = 194)**			
Sociodemographic				
Female/woman	1.63	[0.92; 2.89]	1.66	[0.91; 3.02]
Aged 60+	1.19	[0.76; 1.87]	NI	
White	0.81	[0.45; 1.44]	NI	
Rurality				
Large population (> 100,000)	0.7	[0.44; 1.11]	0.64	[0.39;1.02]
Seeing family physician (FP)				
Frequency seeing FP at least once every three months	1.08	[0.69; 1.72]	NI	
Receiving support from a family member or friend to connect to FP	1.91	[1.11; 3.32]	1.8	[0.98; 3.26]
c. Family physicians (*n* = 124) [1 no response]	**Any virtual care providers (*n* = 96)**			
Sociodemographic				
Female/woman	1.50	[0.57; 3.80]	NI	
White	1.30	[0.45; 3.51	NI	
Rurality				
Large population (> 100,000)	0.80	[0.26; 2.19]	NI	
Family medicine practice				
Years of practice (> 20 years)	**0.29[a]**	**[0.11; 0.75]**	**0.23[b]**	**[0.08; 0.62]**
Type of practice (attachment to)				
Community-based team	0.74	[0.29; 1.83]	0.46	[0.16; 1.24]
Interprofessional team	1.33	[0.52; 3.6]	NI	
Teaching	1.93	[0.64; 7.21]	NI	
Training in Care of Elderly	1.46	[0.48; 5.52]	NI	

Univariate and multiple Logistic regression; NI: Not Included in the model. [a]$p<0.05$. [b]$p<0.01$

of PLWD and care partners. Since then, this approach has been evolving, and physicians appear to ask more patients and care partners about their preferences for virtual or in-person care. The lack of associations with population centre size may partially be explained by the fact that everyone needed to use VC during the early waves of the pandemic. Larger sample sizes with more balanced participation from medium/small/rural areas might be more informative. Virtual care via video use was much lower among PLWD and care partners than FP-reported use. Our data did not allow us to separate out those who chose to use video or telephone where both options were offered vs. those who were only offered one or the other. However, data suggests that proportions of PLWD and caregivers who were offered VC options were small. When offered, only a few of them were not interested or did not know how to use it. Since surveys were conducted during the first phase of the pandemic, it is possible that some provinces did not have the infrastructure to provide video care at that time. Similarly, a qualitative study in England reported that remote consultations were mostly by telephone and commonly managed by the care partner [16]. Studies conducted outside of Canada suggest that VC in general and especially video care is a promising dementia service delivery model for rural patients [12], reduces travel time [33], and may improve care partner-related outcomes [34]. However, barriers to remote consultations remain, including a lack of prompts to remember problems, dealing with new emerging difficulties, rescheduling/missed calls, and inclusion of the voice of the person with dementia [16].

Although three fourths of FPs reported providing VC, FPs with > 20 years in practice were less likely to provide it. Experienced FPs might be more comfortable providing

Table 4 Emerging themes and quotes

	Facilitators	Barriers
DECISION-MAKING FOR VIRTUAL VS. IN PERSON CARE	***Preference for virtual care***: Strongly believes in and was using virtual care before the pandemic "After decades of advocating for improved remuneration and resource support for virtual care of frail persons, the COVID-19 pandemic has finally introduced changes to support virtual care. Finally! Now to see if these essential supports remain"	***Preference for in-person care***: Does not feel a need for virtual care "I learn a great deal more in person" "We just did it because of COVID. No particular strategy, just necessity!"
	Considering virtual care as an alternative care: Finds phone appointments convenient, prefers mixed care, or sees virtual care especially useful for supporting family/caregiver "Often when it comes to dementia, most things can be discussed over the phone" "Appropriate mix of virtual and direct care, not abandoning direct care/visits" "Mostly helpful with caregivers and reduces their burden by improving convenience for them"	***Uncertainty about post-pandemic regulations***: Uncertainty about what will happen post-pandemic "Actually, uncertain if clinic will continue to provide" "[use it after the pandemic] No, absolutely not…government is very combative and non-collaborative and do not care of about our livelihoods and the considerable risk we are all taking working in our clinics to maintain financial stability in a pandemic"
	Reception from PLWD/caregivers: Buy in from patients and caregivers "Patients understanding and supporting this method of care" "Willingness on the patients/family to engage this way. I find if offered most families are keen" "A strong patient-physician relationship and connection with family members"	***Demand from PLWD/caregivers***: High expectations from patients and caregivers "Patients have been booking for frivolous concerns because they know they can get us on the phone"
PREPARATION FOR VIRTUAL CARE ONCE AN APPOINTMENT MADE	***Logistic support from office staff***: Nursing, social worker, secretarial support for obtaining consent, providing instructions, and sending reminders prior to virtual appointment, organizing virtual visits "Clear written information helps, initial email with simple, clear instructions" "Using the social worker to set up and organize the meetings" "I work in a private virtual walk-in clinic, and the nature of visits are screened at intake. Also, the main people accessing the platform are working able-minded individuals who have coverage through their work benefits"	***Consent and confidentiality issues***: Problems may arise when patient and caregiver are together "Need to get the caregiver on the phone and then the patient, consent sometimes can be an issue this is a tough group to get accurate information from as the spouse is often afraid to speak in front of the person with dementia"

Table 4 (continued)

	Facilitators	Barriers
EXECUTION OF VIRTUAL CARE	***Family/caregiver presence***: Engagement of family members or caregivers to assist with and participate in the appointment “Both patient and family/caregiver on the meeting at the same time” “Family member is engaged, and coordinates calls etc.” “Usually, I ask for family member to accompany for collateral information and support through the assessment”	***Patients’ sensory problems***: Hearing, seeing, communication problems “There are many cases when virtual care is extremely challenging for these patients (they can’t hear, they can’t see, they forget, they are not tech savvy, etc)”
	Availability and quality of technology: Videoconference, Zoom, iPad, Internet access “Good techno, [I] got built into my EMR” “Teleconference zoom video conference”	***Poor quality of technology***: Poor technology and connection problems “The phone and video connection where so poor that we abandoned the assessment after 20 min. This will not work in our rural area”
	Technical support from office staff: Setting up and fixing technological issues “Thank goodness for RNs that have to figure out the glitches to making OTN and Microsoft teams run. Rural patients have been a particular difficulty” “Supports through my Academic clinic (secure video, access to an RN)”	
	Existing telemedicine networks: Province had already a telemedicine system working “OTN - I was already registered” “Ongoing government support for remuneration and resources (secure web platforms and email)”	***Lack of technological skills***: Inability to use technology, especially patients “The patient with dementia often can’t manage any of these systems” “I figure out what works for each patient and/or caregiver. It’s mostly by phone, with some in person as needed. Rarely can patients manage the video aspect”
	Peer support on how to use virtual platforms: FPs receiving support from FPs in other provinces “Support from doctors of BC to get training in virtual care platforms. Easy to use these platforms”	
PHYSICIAN COMPENSATION FOR VIRTUAL CARE PROVISION	***Appropriate remuneration***: Payments for virtual care “Government remuneration for phone appointments has removed a barrier” “Billing codes that allow for this, and appropriately compensate with time modifier increments” “I think virtual care is wonderful. There are a lot of things that I don’t physically need to see that patient for, and it can be difficult to get elderly patients to the clinic. The major and only factor that has enabled me to do this is the fee code. I would certainly not offer virtual care if I was not compensated for it”	***Inadequate remuneration***: Does not find renumeration enough “Virtual care is very poorly compensated, and we cannot financially survive providing it. It is very convenient to patients, and they have become very entitled accepting everything to be solved over virtual care when we can only be compensated for the first 10 min”

EMR: Electronic Medical Records. OTN: Ontario Telemedicine Network. PLWD: Persons living with dementia;.RN: Registered nurse in-person care, or they might have established a continuity of care based on in-person appointments [35]. In fact, our qualitative findings supported this since FPs' care preferences and reception by PLWD/families were important at the stage of decision-making for VC. Two fifths of FPs reported providing video care. FPs perceived that support from clinic staff and family was essential for both planning for and execution of VC. The lack of interoperability/connectivity across all points of the health care system is one of the three major barriers of VC according to a Canadian Medical Association report [36]. In Ontario, during the early pandemic months, it was reported that VC increased 56-fold, comprising 71% of primary care physician visits, and the uptake of VC was low among rural residents (61%) [37]. Thus, providing this infrastructure to rural areas is fundamental to promote the use of video care. Lastly, our qualitative findings suggested that FPs perceived remuneration as an important factor affecting their VC use. Similar to this finding, the Canadian Medical Association reported that governance of compensation mechanisms with respect to insured services within and across provincial/ territorial boundaries was a barrier needing to be addressed [36].

Limitations and strengths

First, the generalizability of these results might be limited. Although the number of PLWD and care partner participants was close to those who were targeted at the onset of the surveys, findings may not be generalizable to the over 500,000 Canadians living with dementia today [38]. The sample of FPs might not be representative of all Canadian FPs' perspectives. Low response rate (125/ 11,000 CFPC members = 1.1%) might be linked to a self-selection bias as 3/4 of respondents were female/woman, 1/5 of respondents received training in care of the elderly program, and ¾ of respondents were from Ontario and Saskatchewan.

Second, the wording of some questions might be questionable. The development of the survey was based on consensus between several provinces and organizations and tested with end users, so the wording of some questions might not reflect contemporary evidence but rather end-users' preferences. For instance, the question on gender proposed four options (male, female, other, prefer not to say). We acknowledge that the concepts of gender and sex are complex and multidimensional [39] and that "male" and "female" are usually used for questions on biological sex rather than gender. In addition, while definitions for "community-based team" versus "interprofessional team" might vary from one country to another, they carry a common meaning in Canada. However, it is possible that some FPs might have responded to this question based on their personal definitions.

Third, we also considered some limitations at the stage of analyses. We initially analyzed the responses of care partners who completed the survey on behalf of their relatives living with dementia along with the responses of PLWD themselves. It is suggested that the extent of proxy response bias depends on the domain of research and the nature of the questions being asked and that physical, affective, cognitive, or social status and private, unobservable, or complex questions should be used with caution [40]. In our study, we did not expect significant proxy response bias as questions were about demographics and VC use. Our sensitivity analysis confirmed that the results of the descriptive analysis of PLWD survey by respondent type (PLWD themselves vs. care partners) were similar. In addition, we were unable to determine how many care partners completed both the survey for themselves and on behalf of their relative living with dementia since the surveys were anonymous. However, our objective was not to compare patients vs. proxy responses. Finally, there were some missing data, and dropping incomplete observations might have introduced some bias as we cannot assume that missing data were completely random [32].

Nevertheless, this study has some strengths. It is a study run by two important pan-Canadian organizations, the Alzheimer Society of Canada and the College of Family Physicians; such collaborations are quite rare. It is the first national Canadian study providing a snapshot of the use of VC use in dementia care from the perspectives of PLWD, care partners, and FPs. We believe that the demographics were much more balanced than what would normally occur for national surveys. An important effort was made to facilitate the participation of underrepresented groups. We provided paper-based, multilingual options along with a long open period for the online survey and targeted geographically and ethnically diverse populations. ¼ of the three samples were comprised of Black, Indigenous, or People of Color.

Implications for future research

Future research should explore which elements of dementia care are more or less suitable for virtual visits by categorizing the type of care provided, such as dementia-specific management versus general health issues. It should investigate how cognitive assessments, caregiver involvement, and patient engagement vary between virtual and in-person settings and assess clinical outcomes to determine whether remote visits can maintain care quality. Additionally, addressing accessibility challenges for patients with severe cognitive decline will help ensure equitable access to virtual dementia care.

To better capture a representative range of FP perspectives in future surveys, researchers can leverage healthcare data systems to personalize invitations and use data-driven sampling [41] to ensure diverse practice types are included. Offering multi-modal survey options, targeted recruitment, and incentives, as well as collaborating with professional networks can also boost response rates. Employing a mixed-methods approach with qualitative follow-up and transparent reporting will help identify non-response biases and improve participation.

The comparability of virtual vs. in-person visits in dementia, with respect to effectiveness of communication within particular dimensions of care, is not fully understood. For example, communications during virtual visits can be less effective, particularly for managing dementia-associated behavioral or mood concerns, due to limitations in observing nonverbal cues. In-person visits may allow for more comprehensive assessments, behavioral interventions, and emotional reassurance. Virtual visits, however, may generally be suitable for monitoring well-managed comorbid conditions such as hypertension. These currently unanswered questions require more investigation.

Conclusions

There was a substantial uptake of VC among PLWD, care partners, and FPs. Family physicians having more than 20 years in practice were less likely to adopt VC. According to FPs, decision-making via physician-patient-caregiver partnerships and VC infrastructure played key roles in adopting VC. Primary care providers are often the first point of contact for PLWD and their care partners. Virtual primary care appears to facilitate access to primary care and minimizes the disruptions that may sometimes occur with in-person visits. The use of VC by other health care providers within interprofessional primary care teams (e.g., social workers, nurses) and the effectiveness of virtual primary care on clinical outcomes needs further investigation.

Supplementary Information

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Supplementary Material 1

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Author contributions

SF, SS, and IV developed the original research concept and study design. VK, IV, and DCS proposed the question of research for the present study. SF, SS, and AG were responsible for overseeing data collection. DCS conducted data analyses and developed the draft manuscript. All authors made substantial contributions to the manuscript development, read, and approved the final manuscript.

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Data availability

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The project was approved by the Baycrest Research Ethics Board and McGill Institutional Review Board. All methods were performed in accordance with relevant guidelines and regulations. The online surveys for PLWD and care partners included a section for the informed consent before the questions. For the case of PLWD, an informed consent form accessible in simple language was developed; if they could not consent, the substitute decision-maker (e.g., caregiver) consented on behalf of the PLWD. Physicians were emailed a description of the study that included a link to the survey. By clicking on the survey link and completing the survey, consent was implied. The physician cohort are competent and not a vulnerable population. The survey was anonymous and there were no ways to identify physicians.

Consent for publication

Not applicable.

Competing interests

Dr. Allan Grill declares that he gets paid a salary for his role as Physician Advisor for the College of Family Physicians of Canada. The rest of the authors declare that they have no conflicts of interest.

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