

# Barriers and Facilitators to Implementing Web-Based Dementia Caregiver Education from the Clinician's Perspective: A Qualitative Study

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## Research

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# Abstract

**Background** Internet-based dementia caregiver interventions have been shown to be effective for a range of caregiver outcomes, yet little is known about how best to implement them. We developed iGeriCare, an evidence-based, multimedia, online educational resource for family caregivers of people living with dementia. The objectives of this study were to get feedback and opinions from experts and clinicians involved in dementia care and caregiver education about 1) iGeriCare, and 2) barriers and facilitators to implementing an online caregiver program.

**Methods** We performed semi-structured interviews with individuals who had a role in dementia care/caregiver education in several key stakeholder settings in Southern Ontario, Canada. We queried participants' perceptions of iGeriCare, caregiver education, the implementation process and their experience with facilitators and barriers. Transcripts were coded and analyzed using a grounded theory approach. The themes that emerged were organized using the Consolidated Framework for Implementation Research (CFIR).

**Results** Twelve participants from a range of disciplines described their perceptions of iGeriCare, and identified barriers and facilitators to implementation of the intervention. The intervention was generally perceived as a high-quality resource for caregiver education and support, with many stakeholders highlighting the relative advantage of a web-based format. The intervention was seen to meet dementia caregiver needs, partially due to its flexibility, accessibility and compatibility within existing clinical workflows. Additionally, the intervention helps to overcome time constraints for both caregivers and clinicians.

**Conclusions** Study findings indicate a generally positive response for the use of internet-based interventions for dementia caregiver education. Results suggest that iGeriCare may be a useful clinical resource to complement traditional face-to-face and print material caregiver education. More comprehensive studies are required to identify the effectiveness and longevity of online caregiver education interventions, and continue to better understand barriers and facilitators with respect to the implementation of technology-enhanced caregiver educational interventions in various healthcare settings.

## Contributions to the literature

- The need for dementia caregiver education has been identified as a priority in numerous provincial, national, and global Dementia Strategies. Research has shown that web-based caregiver education interventions may result in a range of improved health outcomes for caregivers, including reductions in depression, stress, distress and anxiety.
- Opinion leaders in dementia care were generally enthusiastic about implementing high quality web-based dementia caregiver education.

· Our findings contribute to the gaps in the literature, including barriers and facilitators into implementation of web-based caregiver educational resources in traditional clinical workflows.

## Background

The prevalence of dementia is increasing, and more family caregivers will be involved in caring for people living with dementia. Despite their key role, many caregivers may have little knowledge of the disorder, community resources, or the caregiving role. As a result of the impact of dementia on caregivers, the Canadian National Dementia Strategy, Ontario Dementia Strategy, Health Quality Ontario Quality Standards for Dementia, and other clinical guidelines all highlight dementia caregiver education as an important component of quality care.(1–6) Providing caregiver education in the clinical setting can be extremely challenging due to time constraints. Caregivers in rural communities may have no access to dementia specialists and therefore no opportunities for face-to-face education.

Internet-based caregiver interventions have emerged as a potential solution to address some of these challenges. A recent needs assessment outlined that caregivers were actively seeking trustworthy sources of information about dementia on the internet.(7) Various systematic reviews suggest that web-based interventions may result in a range of improved health outcomes for caregivers, including reductions in depression, stress, distress and anxiety.(8–11) Other studies have identified that greater public education is needed for caregivers, and improved mechanisms are needed for busy clinicians to provide caregiver education.(12)

We developed iGeriCare ([www.igericare.ca](http://www.igericare.ca)), a multimodal e-learning intervention to help educate family caregivers of people with dementia. It was developed by experts in dementia and online learning, as well as family caregivers, to help meet the needs of caregivers by improving their knowledge and skills, as well as raising awareness of strategies and services to improve their quality of life and that of the person with dementia. iGeriCare consists of ten multimedia e-learning lessons, curated resources, a series of weekly ‘micro-learning’ emails with small segments of content to reinforce material from the lessons, and monthly web-streamed live events that allow participants to post questions to subject matter experts. iGeriCare has been designed to assist health care providers to provide high quality education efficiently and effectively to caregivers of people living with dementia. We applied best practices in e-learning instructional design such as the use of instructional graphics, audio narration, and personalization, which have been shown to be more effective than e-learning that does not conform to best-evidence instructional design.(13, 14)

While web-based education may be an effective intervention, little is known about how best to implement it in various family caregiver education settings.(15) In this study, we performed a qualitative examination to identify recurrent themes, including facilitators and barriers, that might inform other organizations’ planning and implementation efforts with respect to web-based dementia caregiver education. We report on factors affecting implementation of caregiver education from the perspectives of those involved in clinical care of people with dementia and caregiver education.

## Methods

### Study design

We conducted a qualitative study consisting of semi-structured interviews with 12 individuals involved in dementia care and caregiver education, and used a grounded theory approach.(16–19) We chose to use semi-structured interviews as opposed to closed-ended survey questions to allow participants the freedom to express their views in their own terms. We used the Consolidated Framework for Implementation Research (CFIR) to evaluate factors that could influence implementation effectiveness. It provides a pragmatic structure for approaching real-world issues and themes by bringing together key constructs from published implementation theories.(20)

### Setting and timing

The settings were several key stakeholder health care settings in Southern Ontario, Canada, including family medicine clinics, geriatrics/dementia clinics, geriatric psychiatry, and others. The interviews were conducted from October 31, 2018 to March 25, 2019.

### Participants

A total of 12 participants were interviewed, each with a key role related to dementia care and/or caregiver education in their organization. Participants provided written informed consent, and the protocol was approved by the Hamilton Integrated Research Ethics Board (HiREB) at McMaster University.

We targeted opinion leaders who actively work with caregivers from a range of disciplines including geriatrics, neurology, psychiatry, family medicine, and community care. We targeted a wide range of practice settings including hospital, outpatient clinics, and advocacy organizations. For convenience, we stayed within Southern Ontario, as we wanted to conduct the interviews in-person.

### Data collection

Interviews took place in or near the participants' own offices and were conducted by two research team members (SA and LB). The interviewers used an interview guide of semi-structured questions and asked clarifying questions as needed (see Additional file 1). Participants' perceptions of iGeriCare and collateral implementation tools were explored, as well as online dementia caregiver interventions and approaches to caregiver education more generally. Interviewers debriefed with the broader research team after each interview to identify emerging themes and potential areas of exploration and focus for subsequent interviews. Interviews were 30 to 45 minutes in length, were audiotaped, and transcribed verbatim. Only the two research staff members had access to the file linking transcripts with participants' identities.

# Data analysis

Transcripts were analyzed using a grounded theory approach.(16–19) Members of the research team (SA and LB) reviewed an initial transcript to generate a list of concepts and domains to determine a preliminary inductive coding scheme.(21) To test the preliminary inductive coding scheme, the research team applied codes to an initial transcript and revised codes, themes and sub-themes as necessary to yield a final coding scheme by consensus. Two research team members then independently reviewed the transcripts and applied the codes to each transcript by labelling phrases on hard copy. Coding differences between the primary coders were resolved by discussion among the larger research team members weekly, until consensus was achieved. The coded transcripts were entered into QSR International's NVivo 12 qualitative data analysis software to facilitate coding and analysis of transcripts. Research team members compared codes within and across interviews to align and map them with the domains and constructs in the CFIR. The CFIR has been applied to a variety of other contexts (e.g. healthcare delivery and process redesign, quality improvement, health promotion and disease management) and health outcomes (e.g. mental health, obesity and blood pressure). It is most commonly applied to gain an in-depth understanding of participants' experiences (e.g. implementation processes, barriers and facilitators to implementation) in innovation implementation.(22)

## Results

### Participant Characteristics

Fourteen individuals were initially invited to participate; one was unavailable to be interviewed, and one did not respond to correspondence. Of the 12 individuals that participated, eight reported substantial review of the iGeriCare intervention prior to being interviewed, while four reported little-to-no review. Participants had the following disciplines/specialty roles: family medicine (3), geriatrics (3), nursing (2), neurology (1), geriatric psychiatry (1), general internal medicine (1), and social science (1); nine participants were physicians. We tried to engage regional opinion leaders; nine participants were affiliated with the host institution, McMaster University, while three participants were from other institutions/organizations. We present key findings within each of the five CFIR domains and the relevant constructs within each.

### Intervention Characteristics

Intervention characteristics refers to specific characteristics of iGeriCare.(20)

*Theme 1:*

*iGeriCare was generally perceived as a high-quality, trusted intervention for caregiver education, with many participants highlighting the relative advantage of a web-based format.*

The 'design, quality and packaging' of iGeriCare was perceived by many participants as being expertly bundled, presented, and assembled, noting that it was a resource that was 'trusted' and 'valuable'.

*I really like this, partly because it's knowledge that has been vetted, so it's not the same as googling dementia and you really can't control what comes up and what doesn't. So, I like the fact that it's summarized it's at a level where it is easily digestible, and it's not something that is difficult for family members. (Participant 001)*

*It's a very nice-looking website... from what I've seen it's very comprehensive. I mean like, you're hitting caregiver wellness, you're hitting apathy, you're hitting driving – you know, you're hitting promotion of brain health. I mean, it seems like, I don't see any gaps just from a superficial look at it. It looks like it's gone through multiple passes and stuff. It looks very polished. It seems to me that a lot of work has gone into it. (Participant 006)*

'Relative advantage' refers to the participants' perception of the advantage of implementing iGeriCare versus an alternative solution. Most participants perceived the online format and increased ease of access to facilitate dementia education for a wider caregiver audience as a 'relative advantage' when compared with traditional current practice or formats.

*I think with the videos and that sort of thing [iGeriCare] is a much better alternative. It's something that allows them to sit and watch and say, 'oh that's a digestible portion of information that I can take.' (Participant 001)*

*I think it is important. We can't possibly educate everybody about all of this in the context of clinic, nor does it always feel like the right place for it. People just sometimes need to learn on their own at home, and then come back with questions once they've had a chance to be exposed to it. (Participant 002)*

*The hundreds of people that I've heard say in an education series, 'I wish my brothers were here', or 'I wish my father would have joined me.' And they're not coming through our door, and they're not going to their local chapter, or if they live in another part of the province – that they can access [iGeriCare]. (Participant 011)*

A few participants did, however, voice concerns about the format, noting that much of their current caregiver education was delivered with more traditional approaches such as face-to-face delivery or printed pamphlets. Additionally, there remains a perception that older adults do not use the internet or search online for information.

*Many of the older persons that we deal with are either not really that computer-savvy, maybe they spend a little bit of time on the internet and might play some games on their computer, but many of them don't use it to search for information. I think that's a younger generation kind of thing. (Participant 007)*

*Theme 2: iGeriCare is perceived as being readily usable, with minimal disruption to existing workflows, and can be customized or revised as needed.*

The iGeriCare intervention was seen to have minimal barriers to immediate implementation; aligning with the CFIR construct of 'trialability'.

*It will be helpful ...I can see us having it up during our memory clinic. (Participant 002)*

*I am thrilled, this is really phenomenal, I'm going to immediately start using this. (Participant 006)*

*We're already using it. We have the [iGeriCare educational prescription pad], and I give it to families as I'm talking about supports (Participant 008)*

The overall construct of 'intervention characteristics' was perceived positively by the majority of participants.

## Outer Setting

The outer setting is the economic, political, and social context within which an organization resides.(20) It influences implementation and is often mediated through changes in the inner setting.

*Theme 1: iGeriCare was seen to meet patient needs, due to its alternative format, and in part because the flexibility of web-based learning 'on demand' helps to overcome the time constraints that are barriers for both clinicians and caregivers.*

The 'patient needs and resources' construct identifies the extent to which organizations understand the barriers and facilitators to meeting patient needs, as well as their ability to prioritize those needs.(20) Patient needs were identified as an important outer setting construct that could drive demand for services and facilitate participants' support for implementing the intervention.

*[Education] is a lot of 'here are some pamphlets', and it's a lot of relying on the caregiver or on the person who may have an MCI [Mild Cognitive Impairment] diagnosis to go on and sort of read for themselves. So, it can be a little overwhelming ... it's a lot of text and sometimes you can get overwhelmed ... by the end of that hour and a half both of them are tired right, and so something like this [iGeriCare] is great to say 'here, you don't need to try to remember everything I said, I really think you should read this and this, and when I see you again in 6 months, we can answer any questions'. (Participant 001)*

*I definitely think that there's obviously a need. Some people don't like to go to a [location] to be with other caregivers, that's not how they learn. (Participant 008)*

As noted above, patient/caregiver needs were seen to be met through the increased ease of access for a wider audience than traditional education practices currently in place. Healthcare provider participants highlighted the importance of having alternative resources available for delivery to their patients and families.

# Inner Setting

The inner setting refers to the provider's specific practice setting, and includes features of structural, political, and cultural contexts through which the implementation process will proceed.(20) Our specific cohort of participants were selected because they were leaders and decision-makers in their healthcare settings and could provide insight into existing workflows.

*Theme 1: The majority of participants saw the iGeriCare intervention as a good fit with their existing workflows. Conversely, a few participants expressed concerns about implementation within their practice settings and existing workflows.*

Many participants outlined that iGeriCare is presently being used or could easily be implemented due to its 'compatibility' and 'relative priority'. 'Relative priority' refers to the individual perception of the importance of implementation within an organization.(20)

*I think that it would definitely streamline my practice. Because I know that it's one resource that I can trust, and I don't need to be looking for. (Participant 001)*

*If I have a patient with dementia and I meet with the family I would say, 'there's a nice program [iGeriCare] that you could look at, go look at it and then when you come back to see me, later on, we can go over things that you don't understand'. (Participant 012)*

'Implementation climate' identifies the stage of change an organization is in, how receptive individuals are to an intervention, and the extent to which it will be supported in the organization.(20) Within this construct, some participants identified barriers to implementation of web-based education due to their current practices or concerns regarding caregiver demographics.

*I give my overall framework for the patient, I then give them this Alzheimer's Society pack, with lots of information...and I give them a referral sheet. (Participant 003)*

*I think we do a lot of that already via other ways, and I think that for the right person, I could see perhaps if it were a younger caregiver who was looking for more detailed information, perhaps that might be something we might include – but I don't think I would. (Participant 007)*

# Characteristics of Individuals

Characteristics of individuals includes aspects that impact individuals involved with the intervention and/or implementation process.(20)

*Theme 1: Many participants were familiar with the intervention and felt confident in their ability to implement iGeriCare.*

'Knowledge and beliefs about the intervention' refers to the participants' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to it.(20) Our findings showed that those individuals who had taken the time to review iGeriCare were more positively predisposed toward it and placed a higher value on the intervention than those who were less familiar with it.

*I thought it was high quality, overall very useful. (Participant 004; substantial review of the intervention)*

*It would certainly fit with the National Dementia Strategy (Participant 010; substantial review of the intervention)*

*I think it's great that people can go on, listen again to a session that they might have already done, share it with family and friends so there's consistency in, you know, messaging. We want to get everyone within a family network or small community on the same page if you will. (Participant 011; substantial review of the intervention)*

*Theme 2: The relationship of the participants to the iGeriCare developers' institution impacted on their degree of commitment to the intervention.*

Participants did not specifically reference 'individual identification with the organization', a broad construct related to how individuals perceive the organization and their degree of commitment to it.(20) Rather, this was expressed as a sense of pride in their organization's current educational practices. Individuals who more clearly identified with the organizations of the developers of the intervention were more positively predisposed to the intervention and its implementation. Individuals who did not clearly identify with the organizations of the developers were less predisposed to the intervention and its implementation.

## Process

Successful 'implementation process' typically requires an active change process aimed to achieve individual and organization level use of the intervention as designed.(20)

*Theme 1: Most participants felt that they could implement iGeriCare through the use of collateral promotional materials or by sharing the website URL.*

Most participants were confident in their abilities to implement iGeriCare according to plan, which aligns with the CFIR construct of 'executing'. Participants commented on the need to give something to families to go home with and praised the pre-existing iGeriCare promotional materials that are available.

*I think the only way that I can easily pass this information on to patients and their families is if I had something in my hand that I could give them to go away with. Whether it's a card or a link to a website*

*something that can say 'I can vouch for this, this is a good resource I need you to look at this'.*

*(Participant 002)*

*This is great [iGeriCare educational prescription pad], this is so easy you know it's something that can be ready to pull out for every patient. (Participant 004)*

Although most participants felt that they could easily implement iGeriCare, one barrier identified was the need for a constant reminder about the resource to keep it front and centre with the organizations and individuals.

*In primary care there are barriers to any new resource or any new community program and the biggest one is just the 'noise'- the sheer number and volume of programs and tools and resources that are coming at us. (Participant 002)*

*Theme 2: Participants suggested several strategies to continue engaging stakeholders, including finding 'champions', engaging others in the circle of care, presenting at medical conferences, and incorporating the resource into various health professions' curricula.*

Participants commented on the importance of attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities, which aligns with the CFIR construct of 'engaging'.

*I do think it requires someone that is a champion that can bring it in and talk to the benefits of it. And I think when people kind of see how this can match their learning gaps or their knowledge gaps then that's when you are going to get it to pick up for that. (Participant 001)*

*That might be something good to send back to the family doctor to say, 'look I've recommended these things for your families and I think that they many actually come to talk about. Just so you know these are the resources,' and to have that, so the family doctors are aware of, 'maybe I should take a quick look at what's gone on,' and things like that. (Participant 001)*

*It might help with Alzheimer Society's or First Links navigators, where a lot of this one to one peer education may be saved by helping people go through this, but I think it could certainly augment the care that's being provided and it might help provide again support that actually might save some of the [the time of ]allied health staff] (Participant 003)*

*What about the family docs, are you going to be explaining it to them? That's where the patients really are ... (Participant 012)*

In addition to the above identified barriers and facilitators related to implementation of iGeriCare within existing clinical workflows, we also discovered insights into implementation of web-based education more broadly. Participant-identified barriers and facilitators related to implementation of web-based educational interventions for caregivers related to CFIR constructs are summarized in Table 1.

Table 1

Participant-identified barriers and facilitators related to implementation of web-based educational interventions for caregivers (to be inserted on page 19; line 416 above 'Discussion')

	<i><b>Facilitator</b></i>	<i><b>Barrier</b></i>
<b>Intervention Characteristics</b>	The design quality of the intervention in part because of its simplistic layout, large icons, minimal effort.	Skepticism about the relative advantage of web-based nature of intervention.
	The intervention is easily implemented into everyday workflows, allows for healthcare providers to trial with users before committing.	The intervention source being seen as externally developed.
<b>Outer Setting</b>	The format of the intervention being web-based is variably perceived as both a facilitator and a barrier. Tension between healthcare providers as some have positive opinions of the web-based format, and others would not recommend due to concerns that the format might not be useful for some caregivers.	
	The content and format are perceived to be aligned with caregiver needs.	The lack of language, cultural adaptations, and alternative formats (i.e. print).
	Some networking with other external organizations (i.e. Alzheimer Society, hospitals, memory clinics, Family Health Teams).	A lack of external policy and incentives to encourage adoption.
<b>Inner Setting</b>	The intervention easily fits into and is compatible with existing workflows.	Healthcare providers concerns over the amount of time it would take to review materials prior to recommending to patients and families. Lack of integration with Electronic Medical Record (EMR).
	Some settings have a higher relative priority than others for implementation.	Lack of tension for change.
	Access to knowledge and information.	Lack of organizational incentives and rewards.
<b>Characteristics of Individuals</b>	Level of knowledge about the intervention.	
	Identification with the developer organization.	Identification with an external organization.
	Tech-savviness.	Technophobe and/or assumes older adults do not use the Internet.
<b>Process</b>	Ease and enthusiasm to 'execute'.	Needs ongoing 'campaigns' to maintain awareness of resource.
		Needs constant reminders.

<i>Facilitator</i>	<i>Barrier</i>
Existing promotional materials	Costs of promotional materials.
Existing champions and opinion leaders.	Costs of attending conferences and/or identifying and promoting resource to new champions.

## Discussion

In this study, experts in dementia care provided detailed feedback about iGeriCare, as well as barriers and facilitators to implementing an online dementia education program for caregivers more generally. Participants who had reviewed iGeriCare in more depth and identified more with the organization that had developed the intervention, were more positive about the intervention and enthusiastic about adoption/implementation. In addition to the design quality and credibility of the intervention, participants felt that a web-based intervention could easily be introduced and integrated into existing clinical workflows. Some participants had strong beliefs that older caregivers do not use the internet; and were more generally skeptical about the value of web-based interventions over more traditional methods and formats. There were a variety of suggestions with respect to the process of implementation and ongoing dissemination.

This study adds to the growing body of literature on web-based interventions for caregivers of persons with dementia; in particular, it is one of the few studies to examine implementation. Despite the increase in research in this area – it has been estimated that the number of publications in this field increases by 13% each year, including several systematic reviews - we could find very little published with respect to the implementation of web-based caregiver interventions.(9–11, 23–26) Moreover, many of the interventions described in the literature do not appear to be more broadly accessible outside of their research context. To our knowledge, no previous research has used the CFIR framework to study web-based caregiver interventions.

## Barriers and Facilitators to Online Caregiver Education

We found a number of potential barriers and facilitators to implementation of online caregiver education tools in clinical practice.

### Intervention Characteristics

Web-based caregiver interventions may be quite heterogeneous, and may include different components such as health information, education, peer support, professional support, online monitoring, or combinations of these components.(11) Rarely do educational interventions in the literature describe their instructional design or report whether or not they conformed with best practices in multimedia learning. Of the web-based interventions for caregivers of persons with dementia that are available, many focus on peer support, contact with a health or social care provider, decision support, and psychological support.

(26) Few interventions focus solely on the provision of education or information to caregivers. Of the interventions that do focus solely on provision of education, the majority are no longer accessible to the public, which makes it challenging to assess the quality of the online educational resource.

We found that participants were more favourably predisposed to the intervention and its implementation if they identified with the organizational developers of iGerCare. This aligns with the CFIR construct of 'intervention source' – i.e. the perception of key stakeholders about whether the intervention is externally or internally developed.(27–29) With some 'external' participants, intervention adaptability, design quality, and relative advantages outweighed the potential barrier of being an externally developed intervention. In other instances, organizations may feel hesitant to recommend an intervention from an external source for a variety of reasons, including lack of trust, technical concerns, cultural factors, peer pressure to develop their own version, or fear of directing users to an external site and losing donations.

## Outer Setting

Most participants felt that providing caregiver education in a web-based format can reduce the gap for family caregiver support and help to meet their needs, consistent with the literature.(26) Caregivers of persons with dementia may favour reliable online education due to lack of time for face-to-face education, concerns with privacy and stigma, or challenges with travel and arranging care for their care recipient.(25) A number of studies have looked at caregiver experiences with web-based educational resources and reported that caregivers value the convenience and flexibility that online education provides.(30–34)

Despite encouragement from various provincial, national, and global guidelines and quality standards encouraging and referring to the use of online education for older-adult caregivers, it is challenging to change attitudes of potential intervention agents about educational methods and formats. Internet use of Canadians ages 65 and older doubled from 32–68% between 2007 and 2016 - a trend which is expected to continue given the high rates of internet use by those aged 45 to 64.(35, 36) Recent studies support the fact that family caregivers are avid health information seekers.(37) However, analysis of US caregiver survey data found that dementia caregivers reported somewhat lower levels of health-related Internet use compared to the general public. (38) Caregiver age, education levels, and/or income, as well as caregiving stress, were all shown to influence internet use in that study. Raising awareness amongst clinicians with respect to older caregivers' use of the internet may also increase their adoption/incorporation of web-based resource provision into their practice.

One finding of interest relates to the fact that none of our participants mentioned any external policies or incentives that might drive decisions about adoption. This is interesting given recent dementia quality standards that promote caregiver education. More incentives might be an external force to help influence and encourage implementation of effective web-based caregiver educational interventions. (28, 39)

## Inner Setting

Participants represented a range of different clinical practice settings and disciplines, with different structural characteristics. This did not seem to impact their perceptions of the intervention or desire to implement. Many of the participants were affiliated with the same organization – McMaster University – an organization with a relatively flexible culture that embraces innovation. Culture has been shown to have a significant influence on implementation effectiveness and may help to explain enthusiasm for the intervention amongst participants from within this organization. (40, 41)

Most participants enthusiastically voiced a readiness for implementation. This is consistent with elements of iGeriCare such as ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks; as well as the level of resources required to implement the intervention. (27, 42–44) Very few resources are required for implementation, and most participants felt that they could implement iGeriCare through the use of the available collateral promotional materials (e.g. poster, educational prescription pads), or just by sharing the website URL with caregivers. Participants from primary care acknowledged that they were inundated with recommended resources, though, so strategies to better integrate resources into workflows were identified as essential. Some participants were also enthusiastic about less reliance on print-based promotional materials, and voiced an interest in electronic ‘educational prescriptions’, as long as the process was at least as efficient as traditional methods.

The amount of time an organization has to spend reviewing and approving a new web-based resource in addition to the current culture of an organization are potential barriers to implementation of web-based caregiver interventions. However, web-based educational interventions can actually align with existing workflows and can in turn help to overcome barriers, such as time constraints. Our finding of readiness to implement may also reflect the fact that our participants were predominantly leaders with the decision-making power/self-efficacy to implement the intervention. Leadership engagement with the support of clinic administration and physicians is critical for successful implementation of caregiver education delivered online.(42, 43, 45–48)

## **Characteristics of Individuals**

Our findings reflected the importance of two constructs related to characteristics of individuals: the individual identification with the organization, as well as knowledge and beliefs about the intervention. Individual identification is a broad construct related to how individuals perceive the organization and their relationship and degree of commitment to that organization. These attributes may affect the willingness of staff to fully engage in implementation efforts or use the intervention. (49, 50) We found that participants who identified more with the intervention’s organization were more enthusiastic about implementation; although some of this may also reflect the construct of ‘intervention source’ (as noted above), where they felt that the intervention was ‘internally developed’.

The construct of knowledge and beliefs about the intervention was a particularly relevant one. We found that participants’ knowledge about the intervention itself and opinions about older adult use of online health resources were important factors in perceptions of the intervention and its implementation.

Participants with little familiarity with iGeriCare or those who did not think that older adults used the internet were much less likely to consider implementation. Individual clinician attitudes about web-based caregiver education may not be based on the evidence, but rather personal opinions of preference for format of delivery.

Many participants were physicians, and characteristics of individuals and their knowledge and beliefs about interventions may be particularly important constructs in contexts where physicians are the primary implementation agents, as they tend to have a lot of autonomy with respect to implementing interventions – especially within certain practice settings (such as ambulatory clinics or more ‘private practice’ types of settings). Many physicians in independent practice might not strongly identify with their affiliated health care organizations (e.g. hospitals), highlighting the added importance of individual characteristics as a construct in an organization’s potential implementation that may rely on physicians.

## **Process**

Quality of execution relates to several factors, including fidelity of implementation, intensity, timeliness of task completion, and engagement of key stakeholders in the implementation process.(51, 52) Our finding that most participants felt that they could implement iGeriCare immediately through the use of collateral promotional materials that had been developed, or just by sharing the website URL with caregivers suggests that the simplicity of our intervention’s implementation was another major facilitator of adoption. Very little additional planning was needed to implement the intervention. This lack of complexity as a facilitator of implementation is consistent with recommendations of other health technology implementation frameworks.(53–55)

One of the most challenging elements of process relates to the construct of ‘engaging’ – “Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.”(28) Implementation of a resource is heavily dependent on the enthusiasm of users and adopters. It is almost never a ‘one and done’ process but is more of an ongoing campaign that requires constant reminders to existing champions and opinion leaders. This is particularly the case with web-based caregiver education that is not being organizationally mandated. Participants had many suggestions with respect to how to continue to engage health professionals - mostly through continuing professional development conferences or integration into health professional learners’ curricula. Most likely, a multimodal engagement strategy is required, targeting organizations, clinicians, trainees, as well as family caregivers. The costs associated with ongoing promotion and engagement (whether that be marketing costs, personnel, or the true costs of time for champions) are not trivial, and may prove to be an important barrier with respect to the implementation of web-based caregiver education that is not embedded within some type of centralized strategy.

## **Limitations**

Some limitations should be considered when interpreting the results. First, the recruitment of professionals to the project was limited to those residing in Southern Ontario, which might have led to an

underrepresentation of key stakeholders. It might also be a limitation that several of the stakeholders were directly affiliated with the same organizations as the developers of the intervention. However, local and regional implementation of iGeriCare was a key goal of the project, so understanding these leadership attitudes was of importance. We aimed to recruit from a range of different disciplines. Challenges for coding consensus have been identified as a limitation of the CFIR, due to the large overlap of constructs within and between domains.<sup>(56)</sup> Another limitation in application of the CFIR model to web-based interventions identified is the unidirectional (traditional face-to-face) process of implementation.<sup>(56)</sup> The implementation of iGeriCare needs to be investigated longitudinally to analyze its long-term effects on organizations, professional roles, ways of working, and ultimately on caregiver and patient-related outcomes.

## **Conclusion**

In summary, we found that opinion leaders in dementia care were generally enthusiastic about implementing high quality web-based dementia caregiver education. Key facilitators included quality of the design of the intervention; ease of implementation; and value-added for both the health care system and caregivers. Key barriers included perception of the intervention coming from an external source/organization; lack of policy incentives; current normative professional behaviours around health teaching/caregiver education; individuals' knowledge of the intervention and opinions about older caregiver use of the internet; and the costs and challenges with respect to ongoing engagement, awareness-raising, and promotion of the intervention. Despite an increase in the number of interventions and research about web-based caregiver interventions, there is very little work to date describing their implementation. Frameworks such as CFIR and others are helpful in delineating the various domains related to implementation of web-based caregiver interventions. Further research with respect to the specific implementation of caregiver education interventions would be beneficial, given the increasing development of these interventions.

Our results have led us to increase dissemination of collateral promotional materials, continue engagement with various champions and intervention agents, and ongoing multimodal strategies for implementation. A new educational prescription web application for clinicians is being field tested. This innovation may help to determine the reach of the intervention, in addition to providing other measures of whether the educational prescription gets 'filled' by the caregiver, as well as some data related to the 'dose' of the educational intervention.

## **Abbreviations**

CFIR – Consolidated Framework for Implementation Research

## **Declarations**

# Ethics Approval and Consent to Participate

Approval to conduct the study was gained from the Hamilton Integrated Research Ethics Board.

## Consent for Publication

All participants provided written informed consent before participating in the study.

## Availability of Data and Materials

The dataset (which includes individual transcripts) is not publicly available due to confidentiality policies.

## Competing Interests

Dr. Levinson and Dr. Sztramko are co-owners of the iGeriCare intervention with McMaster University.

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## Authors' contributions

AJL and RS led the conception and design of the study. SA and LB conducted all participant interviews. SA transcribed audio recordings of interviews. AJL, SA and LB developed and applied the coding scheme. AJL and SA reviewed coding, identified themes, and drafted the manuscript. RS, AP and SM revised the manuscript. All authors read and approved the final manuscript.

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## References

1. Health Quality Ontario. Recommendations for adoption: Dementia care in the community. [Internet]. Queen's Printer for Ontario. 2018 [cited 2019 Oct 8]. Available from: <https://hqontario.ca/Portals/0/documents/evidence/quality-standards/qs-dementia-recommendations-for-adoption-en.pdf>
2. Health Quality Ontario. Evidence to improve care [Internet]. [cited 2019 Oct 8]. Available from: <https://www.hqontario.ca/Evidence-to-Improve-Care/Quality-Standards/View-all-Quality-Standards/Dementia/Quality-Statement-5-Education-and-Training-for-People-Living-With-Dementia-and-Their-Caregivers>
3. Health Quality Ontario. Getting started guide: Putting quality standards into practice [Internet]. 2017 [cited 2019 Oct 8]. Available from: <https://www.hqontario.ca/Portals/0/documents/evidence/quality-standards/getting-started-guide-en.pdf>
4. Ontario Ministry of Health and Long Term Care. Developing Ontario's dementia strategy: A discussion paper. 2016;(September):1–54. Available from: [https://files.ontario.ca/developing\\_ontarios\\_dementia\\_strategy\\_-\\_a\\_discussion\\_paper\\_2016-09-21.pdf](https://files.ontario.ca/developing_ontarios_dementia_strategy_-_a_discussion_paper_2016-09-21.pdf)
5. Canadian Academy of Health Sciences. Improving the quality of life and care of persons living with dementia and their caregivers [Internet]. 2019. Available from: <https://cpp.178.myftpupload.com/wp-content/uploads/2019/04/REPORT.pdf>
6. Public Health Agency of Canada. A dementia strategy for canada: together we aspire [Internet]. Ottawa, Ontario; 2019. Available from: [https://www.canada.ca/content/dam/phac-aspc/images/services/publications/diseases-conditions/dementia-strategy/National Dementia Strategy\\_ENG.pdf](https://www.canada.ca/content/dam/phac-aspc/images/services/publications/diseases-conditions/dementia-strategy/National Dementia Strategy_ENG.pdf)
7. Ringer TJ, Wong-Pack M, Miller P, Patterson C, Marr S, Misiaszek B, et al. Understanding the educational and support needs of informal care-givers of people with dementia attending an outpatient geriatric assessment clinic. *Ageing Soc* [Internet]. 2020 Jan 28;40(1):205–28. Available from: [https://www.cambridge.org/core/product/identifier/S0144686X18000971/type/journal\\_article](https://www.cambridge.org/core/product/identifier/S0144686X18000971/type/journal_article)
8. Ploeg J, Ali MU, Markle-Reid M, Valaitis R, Bartholomew A, Fitzpatrick-Lewis D, et al. Caregiver-focused, web-based interventions: Systematic review and meta-analysis (Part 2). *J Med Internet Res* [Internet]. 2018 Oct 26;20(10):e11247. Available from: <http://www.jmir.org/2018/10/e11247/>
9. Deeken F, Rezo A, Hinz M, Discher R, Rapp MA. Evaluation of technology-based interventions for informal caregivers of patients with dementia—A meta-analysis of randomized controlled trials. *Am J Geriatr Psychiatry* [Internet]. 2019 Apr;27(4):426–45. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1064748118305876>
10. Zhao Y, Feng H, Hu M, Hu H, Li H, Ning H, et al. Web-based interventions to improve mental health in home caregivers of people with dementia: Meta-analysis. *J Med Internet Res* [Internet]. 2019 May 6;21(5). Available from: <http://www.jmir.org/2019/5/e13415/>

11. Sherifali D, Ali MU, Ploeg J, Markle-Reid M, Valaitis R, Bartholomew A, et al. Impact of internet-based interventions on caregiver mental health: Systematic review and meta-analysis. *J Med Internet Res* [Internet]. 2018 Jul 3;20(7):e10668. Available from: <http://www.jmir.org/2018/7/e10668/>
12. Peterson K, Hahn H, Lee AJ, Madison CA, Atri A. In the information age, do dementia caregivers get the information they need? Semi-structured interviews to determine informal caregivers' education needs, barriers, and preferences. *BMC Geriatr* [Internet]. 2016 Dec 23;16(1):164. Available from: <http://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-016-0338-7>
13. Clark RC, Mayer RE. *E-learning and the science of instruction*. 3rd ed. Wiley; 2008.
14. Mayer RE. Using multimedia for e-learning. *J Comput Assist Learn* [Internet]. 2017 Oct;33(5):403–23. Available from: <http://doi.wiley.com/10.1111/jcal.12197>
15. Ploeg J, Markle-Reid M, Valaitis R, McAiney C, Duggleby W, Bartholomew A, et al. Web-based interventions to improve mental health, general caregiving outcomes, and general health for informal caregivers of adults with chronic conditions living in the community: Rapid evidence review. *J Med Internet Res* [Internet]. 2017 Jul 28;19(7):e263. Available from: <http://www.jmir.org/2017/7/e263/>
16. Miles MB, Huberman AM. *Qualitative data analysis*. Thousand Oaks, California: Sage Publications; 1994.
17. Patton Q. *How to use qualitative methods in evaluation*. Newsbury Park, London, New Dehli: Sage Publications; 1987.
18. Miller DC, Salkind NJ. *Handbook of research design and social measurement*. 6th ed. Sage Publicaations; 2002.
19. Chapman A, Hadfield M, Chapman C. Qualitative research in healthcare: an introduction to grounded theory using thematic analysis. *J R Coll Physicians Edinb* [Internet]. 2015;45(3):201–5. Available from: [http://www.rcpe.ac.uk/sites/default/files/jrcpe\\_45\\_3\\_chapman.pdf](http://www.rcpe.ac.uk/sites/default/files/jrcpe_45_3_chapman.pdf)
20. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci* [Internet]. 2009 Dec 7;4(1):50. Available from: <http://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-4-50>
21. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods* [Internet]. 2006 Mar 29;5(1):80–92. Available from: <http://journals.sagepub.com/doi/10.1177/160940690600500107>
22. Kirk MA, Kelley C, Yankey N, Birken SA, Abadie B, Damschroder L. A systematic review of the use of the consolidated framework for implementation research. *Implement Sci* [Internet]. 2015 Dec 17;11(1):72. Available from: <http://implementationscience.biomedcentral.com/articles/10.1186/s13012-016-0437-z>
23. Waller A, Dilworth S, Mansfield E, Sanson-Fisher R. Computer and telephone delivered interventions to support caregivers of people with dementia: a systematic review of research output and quality. *BMC Geriatr* [Internet]. 2017 Dec 16;17(1):265. Available from: <https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-017-0654-6>

24. Spencer L, Potterton R, Allen K, Musiat P, Schmidt U. Internet-based interventions for carers of individuals with psychiatric disorders, neurological disorders, or brain injuries: Systematic review. *J Med Internet Res* [Internet]. 2019 Jul 9;21(7):e10876. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31290399>
25. Ploeg J, McAiney C, Duggleby W, Chambers T, Lam A, Peacock S, et al. A web-based intervention to help caregivers of older adults with dementia and multiple chronic Conditions: Qualitative study. *JMIR Aging* [Internet]. 2018 Apr 23;1(1):e2. Available from: <http://aging.jmir.org/2018/1/e2/>
26. Hopwood J, Walker N, McDonagh L, Rait G, Walters K, Iliffe S, et al. Internet-based interventions aimed at supporting family caregivers of people with dementia: Systematic review. *J Med Internet Res* [Internet]. 2018 Jun 12;20(6):e216. Available from: <http://www.jmir.org/2018/6/e216/>
27. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q* [Internet]. 2004 Dec;82(4):581–629. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/15595944>
28. CFIR Research Team-Center for Clinical Management. Consolidated framework for implementation research constructs [Internet]. 2009 [cited 2020 Jan 17]. Available from: <https://cfirguide.org/>
29. Van de Ven A, Polley D, Garud R, Venkataraman S. *The innovation journey*. Oxford University Press; 2008.
30. Ducharme F, Dubé V, Lévesque L, Saulnier D, Giroux F. An online stress management training program as a supportive nursing intervention for family caregivers of an elderly person. *Can Nurs Informatics J* [Internet]. 2011;6(2):1–26. Available from: <http://cjni.net/journal/?p=1344>
31. Beauchamp N, Irvine AB, Seeley J, Johnson B. Worksite-based internet multimedia program for family caregivers of persons with dementia. *Gerontologist* [Internet]. 2005 Dec 1;45(6):793–801. Available from: <http://academic.oup.com/gerontologist/article/45/6/793/553049>
32. Lewis ML, Hobday J V., Hepburn KW. Internet-based program for dementia caregivers. *Am J Alzheimer's Dis Other Dementiasr* [Internet]. 2010 Dec 4;25(8):674–9. Available from: <http://journals.sagepub.com/doi/10.1177/1533317510385812>
33. Marziali E, Garcia LJ. Dementia caregivers' responses to 2 internet-based intervention programs. *Am J Alzheimer's Dis Other Dementiasr* [Internet]. 2011 Feb;26(1):36–43. Available from: <http://journals.sagepub.com/doi/10.1177/1533317510387586>
34. Pagán-Ortiz ME, Cortés DE, Rudloff N, Weitzman P, Levkoff S. Use of an online community to provide support to caregivers of people with dementia. *J Gerontol Soc Work* [Internet]. 2014 Oct 3;57(6–7):694–709. Available from: <http://www.tandfonline.com/doi/abs/10.1080/01634372.2014.901998>
35. Statistics Canada. Evolving internet use among Canadian seniors [Internet]. 2019 [cited 2020 Jan 8]. p. 1–19. Available from: <https://www150.statcan.gc.ca/n1/pub/11f0019m/11f0019m2019015-eng.htm>
36. Anderson M, Perrin A. Tech adoption climbs among older adults [Internet]. 2017. Available from: <http://www.pewinternet.org/2017/05/17/technology-use-among-seniors/>

37. Bangerter LR, Griffin J, Harden K, Rutten LJ. Health information-seeking behaviors of family caregivers: Analysis of the health information national trends survey. *JMIR aging* [Internet]. 2019 Jan 14;2(1):e11237. Available from: <https://aging.jmir.org/2019/1/e11237/>
38. Kim H. Understanding internet use among dementia caregivers: Results of secondary data analysis using the US caregiver survey data. *Interact J Med Res J Med Res* [Internet]. 2015 Feb 23;4(1):e1. Available from: <http://www.i-jmr.org/2015/1/e1/>
39. Grol R, Bosch M, Hulscher M, Eccles M, Wensing M. Planning and studying improvement in patient care: The use of theoretical perspectives. *Milbank Q* [Internet]. 2007 Mar;85(1):93–138. Available from: <http://doi.wiley.com/10.1111/j.1468-0009.2007.00478.x>
40. Shortell SM, Zazzali JL, Burns LR, Alexander JA, Gillies RR, Budetti PP, et al. Implementing evidence-based medicine: the role of market pressures, compensation incentives, and culture in physician organizations. *Med Care* [Internet]. 2001 Jul;39(7 Suppl 1):I62-78. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11488265>
41. Helfrich CD, Li Y-F, Mohr DC, Meterko M, Sales AE. Assessing an organizational culture instrument based on the competing values framework: Exploratory and confirmatory factor analyses. *Implement Sci* [Internet]. 2007 Dec 25;2(1):13. Available from: <http://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-2-13>
42. Klein KJ, Conn AB, Sorra JS. Implementing computerized technology: An organizational analysis. *J Appl Psychol* [Internet]. 2001;86(5):811–24. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/0021-9010.86.5.811>
43. Helfrich CD, Weiner BJ, McKinney MM, Minasian L. Determinants of implementation effectiveness. *Med Care Res Rev* [Internet]. 2007 Jun 5;64(3):279–303. Available from: <http://journals.sagepub.com/doi/10.1177/1077558707299887>
44. Wallin L, Estabrooks CA, Midodzi WK, Cummings GG. Development and validation of a derived measure of research utilization by nurses. *Nurs Res* [Internet]. 2006 May;55(3):149–60. Available from: <http://journals.lww.com/00006199-200605000-00001>
45. Boersma P, van Weert JCM, Lakerveld J, Dröes R-M. The art of successful implementation of psychosocial interventions in residential dementia care: a systematic review of the literature based on the RE-AIM framework. *Int Psychogeriatrics* [Internet]. 2015 Jan 5;27(1):19–35. Available from: [https://www.cambridge.org/core/product/identifier/S1041610214001409/type/journal\\_article](https://www.cambridge.org/core/product/identifier/S1041610214001409/type/journal_article)
46. Lukas CV, Holmes SK, Cohen AB, Restuccia J, Cramer IE, Shwartz M, et al. Transformational change in health care systems. *Health Care Manage Rev* [Internet]. 2007 Oct;32(4):309–20. Available from: <http://journals.lww.com/00004010-200710000-00003>
47. Meyer AD, Goes JB. Organizational assimilation of innovations: A multilevel contextual analysis. *Acad Manag J* [Internet]. 1988 Dec;31(4):897–923. Available from: <http://journals.aom.org/doi/10.5465/256344>
48. Repenning NP. A simulation-based approach to understanding the dynamics of innovation implementation. *Organ Sci* [Internet]. 2002 Apr;13(2):109–27. Available from:

<http://pubsonline.informs.org/doi/abs/10.1287/orsc.13.2.109.535>

49. Greenberg J. Organizational justice: Yesterday, today, and tomorrow. *J Manage* [Internet]. 1990 Jun 30;16(2):399–432. Available from: <https://doi.org/10.1177/014920639001600208>
50. Abraham R. Organizational cynicism: bases and consequences. *Genet Soc Gen Psychol Monogr* [Internet]. 2000 Aug;126(3):269–92. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10950198>
51. Carroll C, Patterson M, Wood S, Booth A, Rick J, Balain S. A conceptual framework for implementation fidelity. *Implement Sci* [Internet]. 2007 Dec 30;2(1):40. Available from: <http://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-2-40>
52. Pearson ML, Wu S, Schaefer J, Bonomi AE, Shortell SM, Mendel PJ, et al. Assessing the implementation of the chronic care model in quality improvement collaboratives. *Health Serv Res* [Internet]. 2005 Mar 24;40(4):978–96. Available from: <http://doi.wiley.com/10.1111/j.1475-6773.2005.00397.x>
53. Greenhalgh T, Wherton J, Papoutsi C, Lynch J, Hughes G, A’Court C, et al. Beyond adoption: A new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the scale-up, spread, and sustainability of health and care technologies. *J Med Internet Res* [Internet]. 2017 Nov 1;19(11):e367. Available from: <http://www.jmir.org/2017/11/e367/>
54. Greenhalgh T, Wherton J, Papoutsi C, Lynch J, Hughes G, A’Court C, et al. Analysing the role of complexity in explaining the fortunes of technology programmes: empirical application of the NASSS framework. *BMC Med* [Internet]. 2018 Dec 14;16(1):66. Available from: <https://bmcmmedicine.biomedcentral.com/articles/10.1186/s12916-018-1050-6>
55. Greenhalgh T, Abimbola S. The NASSS framework - A synthesis of multiple theories of technology implementation. *Stud Health Technol Inform* [Internet]. 2019 Jul 30;263:193–204. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/31411163>
56. Lord S, Moore SK, Ramsey A, Dinauer S, Johnson K. Implementation of a substance use recovery support mobile phone app in community settings: Qualitative study of clinician and staff perspectives of facilitators and barriers. *JMIR Ment Heal* [Internet]. 2016 Jun 28;3(2):e24. Available from: <http://mental.jmir.org/2016/2/e24/>

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