The patients' and healthcare professionals' perceptions of an innovative telehealth system designed for community-based older adults with depressive symptoms.

Cheryl Forchuk[1,2,3,4]***, Akshya Vasudev**[2,3]**, Amer M Burhan**[2,3]**, Richard Booth**[1]**, Jeff Hoch**[5]**, Wanrudee Isaranuwatchai**[5]**, Maxine Lewis**[6]**, Daniel J Lizotte**[12]**, Abraham Rudnick**[11]**, Mary Chambers**[7]**, Fiona Nolan**[8]**, Alastair J Flint**[9]**, Karl Looper**[10]**, Keri-Leigh Cassidy**[11]**, Soham Rej**[10]**, Boniface Harerimana**[1,2]**, Tony O'Regan**[1,2]**, Jeffrey P Reiss**[2,3]

[1]Arthur Labatt Family School of Nursing, Western University, London, Ontario, Canada
[2]Lawson Health Research Institute, London, Ontario, Canada
[3]Schulich School of Medicine and Dentistry, Department of Psychiatry, Western University, London, Ontario, Canada
[4]Beryl and Richard Ivey Research Chair in Aging, Mental Health, Rehabilitation and Recovery
[5]Institute of Health Policy, Management and Evaluation (IHPME), University of Toronto, Ontario, Canada
[6]St. Joseph's Healthcare Hamilton, Department of Psychiatry and Behavioural Neurosciences, McMaster University, Ontario, Canada
[7]Kingston University, London, UK
[8]School of Health and Social Care, University of Essex, Colchester, UK
[9]Centre for Mental Health, University Health Network and Department of Psychiatry, University of Toronto, Ontario, Canada
[10]Jewish General Hospital, McGill University, Montreal, Quebec, Canada
[11]Dalhousie University, Nova Scotia, Canada
[12]Faculty of Science, Department of Computer Science, Western University, London, UK

Abstract

Objectives: New solutions are required to address challenges associated with delivering mental health care to older adults. This telehealth and patient-reported outcome measurement for geriatrics (TELEPROM-G) study sought to evaluate older adults' living in the community with depressive symptoms and healthcare providers' perceptions of videoconferencing and electronic Collaborative Health Record (CHR) platform for mental healthcare service delivery.

Methods: This component of TELEPROM-G study used focused ethnography to collect qualitative data from thirty older adults and eight health care providers (HCP) recruited from two older adult mental health outpatient programs in Ontario, Canada. Focus groups for patients and HCPs were conducted separately to evaluate perceptions of the CHR platform.

Results: The study retained 26 (87%) client participants and all staff participants until its completion. Patients and health care providers reported improved communication facilitated by the CHR platform and noted the platform could reduce the need to travel to appointments. Patient suggestions for improving this technology included using an electronic diary to help with recalling appointments and setting up prompts for medications.

Conclusion: An electronic collaborative health resource platform seems to be feasible in busy seniors' mental health clinic. Future telehealth may consider features that promote more patient autonomy, accommodating patients with visual and mobile impairments, and making the platform accessible on multiple electronic devices, such as phones, tablets. Health care providers and patients will need to openly communicate preferences and expectations with each other for positive uptake and clinical use of the platform.

Introduction

Projections of the world population have shown a consistent rise of older adults between 1950 and 2020 [1]. In developed countries such Canada, the population aged 65 years or older showed a historical increase of 20%, outnumbering young people aged 14 years and younger (5,935,630 vs 5,839,565)

between 1986 and 2016 [2]. Additionally, in 2009, Statistics Canada reported that fewer than half (43.6%) of surveyed older adults reported excellent or good health [3]. As the number of older adults increases, the healthcare sector will need to adapt to meet their expanding healthcare needs. Extensive evidence indicates that the clinician driven model of care is not adequately meeting the needs of older adults for continuity of

healthcare [4-6]. This is particularly relevant for chronic health conditions, including depression. For example, out of 3,132 older adults with a chronic health condition who participated in a 2011 Canadian survey, only 45% were able to talk to a healthcare provider (HCPs) about specific things they could do to improve their health or prevent illness (Canadian Institute of Health Information [CIHI] [7]. This may be related to the scarcity of healthcare providers and few community-based services, especially inadequate communication between team members, limited follow-up, and gaps in services as patients move between healthcare professionals and across care settings [6].

Depression is common in older adults and stands out as a pervasive and complex health problem [8]. It has been consistently associated with chronic physical illness and can amplify any related disability [9-15]; thereby contributing to poor health outcomes among older adults [14]. Due to associated apathy, asthenia, helplessness and hopelessness, depressed older adults may be less likely to comply with scheduled healthcare appointments and may make more use of emergency departments at times of increased distress [8]. In 2009-2010, the Canadian Institute for Health Information found that older adults ages 65 and older are more likely to have longer stays in the emergency department (4 hrs.) compared to adults ages 20-64 (2.5 hrs.); and their admission rates following emergency department visits range from 30-50% [7,15]. Older adults' use of hospital services measured by the number of visits and the resources used during their visits was 70% higher than non-seniors [8]. Given these issues, in-home assessment can potentially improve the management of older adults with depressive symptoms, offer more timely treatment, and decrease health care costs.

Telehealth interventions, such as the remote provision of healthcare using telecommunication devices [16] have proven effectiveness in creating opportunities for timely responses to the mental healthcare needs of older adults. They can lessen the burden on health delivery systems [17]. Research using telehealth among older adults with depression has demonstrated significant improvement in terms of clinical symptoms [18]. Additionally, telehealth interventions, which used scripted psychosocial, educational material and questionnaires, showed reductions in hospital re-admissions and the use of emergency services in a sample of older adults suffering from depression [19]. There are discrepancies in findings of studies that explored factors for the uptake of telehealth in samples of older adults compared with those which looked at other groups. For example, a survey of adults between ages 50-68 conducted in Australia in 2014 found that demographics including geographical location and distance to the hospital were not significant predictors of telehealth use [20]. In contrast, in the United States, a study by Gardner in 2015 surveyed individuals with an average age of 57.9 found that living far from the hospital was a strong predictor of using telehealth [19]. More generally, there is a paucity of studies exploring the use of telehealth among older adults with depression.

The telemedicine and patient-reported outcome measurement for older adults (TELEPROM-G) pilot study provided older adults and their health care providers (HCPs) with mental healthcare services delivered using an electronic Collaborative Health Record (CHR) and video teleconferencing feature called "virtual visits" which allowed the HCP and patient to interact live using a secure video chatting feature. The TELEPROM-G study evaluated older adults and HCPs perceptions on the implementation of TELEPROM-G and aimed to inform improvements to the CHR platform's features. The following qualitative research questions guided TELEPROM-G study:

- What are the perceptions of older adults with depressive symptoms and their health care providers regarding the benefits and difficulties associated with the TELEPROM-G intervention?

- What are the participants' opinions concerning how further modifications of the TELEPROM-G could improve their experience of using it?

Research Methodology

Study design and sampling

The present paper reports on the qualitative component of a mixed-methods study that used focused ethnography, a methodological approach appropriate for investigating healthcare practice phenomena and contexts using people with specific knowledge in a relatively short period [21,22]. In contrast to traditional ethnographic approaches, a focused ethnographic approach enables us to identify and describe phenomena that potentially facilitate, obstruct or sustain health practices in particular contexts [23]; in this case, the use of the CHR platform and virtual visits.

This study recruited participants from older adult outpatient services of two hospitals in Ontario, Canada. The sample included eight health care providers and thirty individual patients who met the study criteria. Recruitment entailed enrolling HCPs who then referred patient participants from their caseloads. The inclusion criteria for patients were: being an outpatient on the caseload of community mental health services affiliated with one of the two participating hospitals; being aged 65 years or older; having depressive symptoms; not having significant cognitive deficits (as determined by a Mini-Mental State Examination (MMSE) [24] score of 19 or less); and scoring over five on the Geriatric Depression Scale (GDS) [25]. Health care providers were included in the study if they were employed in a community mental health team that provided service to adults ages 65 and older who had depressive symptoms.

Data collection procedures

The study obtained ethical approval from Western University's Human Sciences Research Ethics Board and the Clinical Research Impact Committees of the two participating hospitals. Healthcare professionals and eligible patients enrolled by providing their written, informed consent. Patient participants received a Wi-Fi enabled computer tablet device that allowed in-cloud storage of anonymized information with encrypted and password-protected access. Twenty enrolled patient-participants already had in-home Wi-Fi. In cases where participants did not have access to Wi-Fi in the home, the cost of the Wi-Fi service

was provided for the duration of the study. Participants were trained to use the tablet device and a web-based CHR platform. The CHR in this study recorded personal health information and ratings from self-administered questionnaires. It also used digital prompts and reminders to support care planning and enabled secure HCP-patient communication by video. See Appendix A for the CHR interface, which is presented in Figures 1 and 2.

Qualitative data were gathered during four focus groups which were facilitated by a master's level research assistant and member of the research team. The first two focus groups took place two months after the intervention had started. Patients and health care providers participated in separate groups, and both focused on the barriers and facilitators of adopting TELEPROM-G, and on perceptions of the program. Discussions in each group were audio-recorded, and the recordings were subsequently transcribed verbatim. Additionally, two trained research assistants, university students/graduates were present at the groups and took field notes to identify speakers and describe the context of each group. Transcribed audio was verified by another member of the research team.

Data analysis

A four-step ethnographic approach was employed to analyse the data from the focus groups [26]. The analysis consisted of finding descriptors, distinct features of data from transcripts, which were used to identify recurrent themes. The identified recurrent themes were then collapsed into major themes. Data analysis also involved refining, defining, and describing framed themes by exemplar quotes from the transcripts. The framed themes were then analysed for their meaning concerning the context of the study participants. To ensure the credibility of findings, all co-researchers independently reviewed preliminary results and provided comments; which were then combined

and integrated into the final results [27]. Table 1 Data analysis matrix presents a summary of the results.

Results

The study achieved full enrolment of 30 patients, of which four withdrew before the end of the one-year intervention period. They were all over 65 years of age, with an average age of 72.83(SD=4.84), and 12(40%) were male. In terms of education, three (10%) had grade (primary) school, 14(46.7%) had high (secondary) school, and 13(43.3%) had post-secondary (university) education. Sixteen were living alone, and the remainder lived with family members. Twenty participants were diagnosed with two or more psychiatric conditions, of which anxiety disorders (n=17; 56.7%) and mood disorders (n=27; 90%) were the most prevalent. Twenty-seven had concurrent physical and psychiatric conditions, which included arthritis (n=10; 33.3%); hypertension (n=10; 33.3); and anxiety disorders (n=17; 56.7%). All were taking prescribed medications for mental health issues, and 15 (50%) had been admitted to a psychiatric hospital at some point in their lives.

Three overarching themes were identified: (1) Perceived benefits of using the CHR platform, which include enhanced communication, greater convenience, and user-friendliness. (2) Perceived difficulties of using the CHR platform, which included technical device-related issues, and concerns with privacy and confidentiality; (3) suggestions for improvements, which involved issues with features and functionalities, and modifications addressing concerns for confidentiality. These themes are presented in Table 1.

Perceived benefits of the use of the CHR platform

Enhanced communication between patients and health care providers: Patients could communicate with their healthcare provider by completing questionnaires and participating in
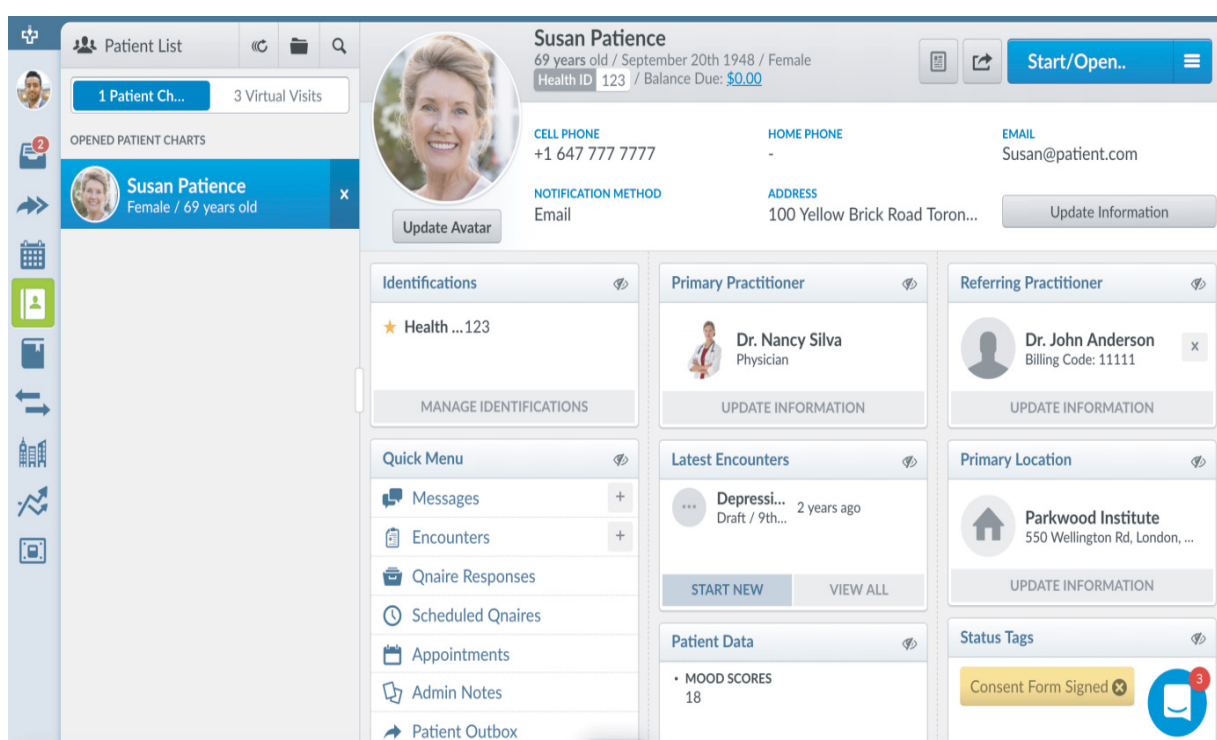

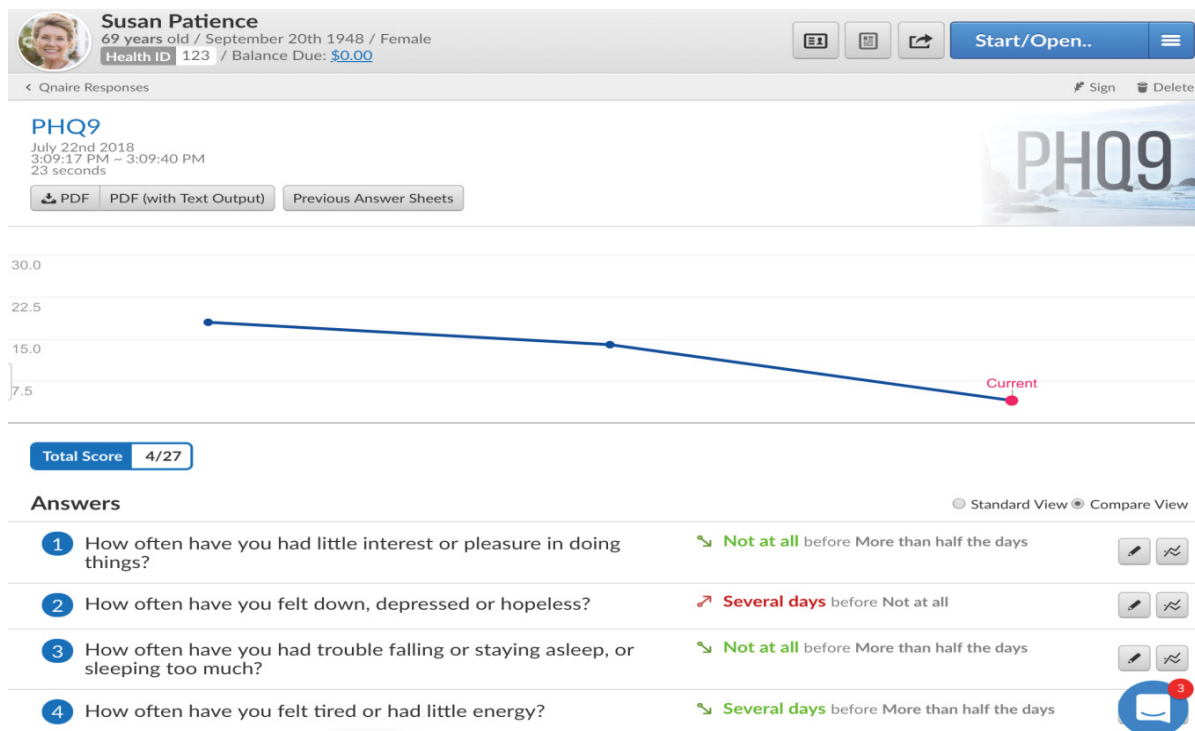*Figure 1.* The healthcare provider's side of the CHR interface.

Figure 2. CHR interface from the patient's side.

Table 1. Summary of results.

Descriptors	Major themes	Sub themes
What are experiences using the CHR platform?	Perceived benefits of the use of the CHR platform	• Enhanced communication between clients-HCPs • Greater convenience due to lower constraints • User-friendliness
Any encountered problems?	Difficulty using the CHR platform	• Technical device-related issues • Concern about privacy and confidentiality
Any wishes/suggestions about improvement?	Suggestions for modifications to the CHR platform	• Modifications for addressing issues with features and functionalities • Modifications for addressing concerns about confidentiality

videoconferencing sessions, which were referred to as virtual visits. One female, patient's example of the benefits of virtual visits was: '*With my care provider, what we have done now, she gives me a date to do the survey and then ...the following week I would meet with her*.' The use of the CHR platform also improved patients' feelings of being connected and supported. Quotes from the HCP focus groups demonstrated this change in patient's feelings: One female HCP stated, '*…With one particular person, it's gone quite well… it's given us the opportunity just to stay a bit more connected with him ... it's supportive for him*'.

Greater convenience due to lower constraints: Both groups reported that the CHR platform was user-friendly and partly alleviated difficulties caused by parking and travelling. One patient (male) said: '*When I had the meeting with my health nurse, she'll come on at the same time and you know… It's very easy for me because I don't want to be travelling from my place up to the hospital all the time*'. Another patient (female) said, '*…getting parking, it is expensive, if the weather [is snowy] or when you are coming from a small city, so many variables are there if you are working, if you are a caregiver for your grandchild…*'

HCPs highlighted that the use of the CHR platform would

be particularly beneficial for those living in rural settings. They noted that their patients benefited from not needing transportation to meet with them, and it also mitigated patients missing scheduled office appointments due to health or weather-related issues. One female HCP stated, '*I could see that it is being very helpful for people in the region, right? Because we cover people in the region, so, you know, if I can't get to ... and it's a snowy awful day*'). Another female HCP indicated that the portability of the tablet makes it convenient, '*…I have a patient that is travelling, and they seem to be taking it with her and using it in the airport... so she finds that being light and she can carry it in a small bag is actually quite helpful*.' HCPs felt that time constraints were eased through using the platform, '*It's improved our time too because, you know, I am seeing someone that it would take me half an hour to get to their house and then get in the apartment and then have a visit and half an hour back, so that's improved*' (female HCP).

User-friendliness: Both patients and HCPs thought the CHR platform was easy to use and helpful, for example, one female patient noted: '*computer is not threatening it is not somebody yelling at you "eat!" or scolding you for something that you did not do right. Remembering something you know*'. HCPs reported that they felt comfortable using the TELEPROM-G

platform because of the helpfulness of the website hosting the CHR platform. '…*I think the website is quite intuitive. I feel comfortable, being reasonably computer savvy, so just to navigate around*' said a male HCP. Another HCP (female) acknowledged that the end of the project would leave memories of excellent CHR platform-related benefits.

'*It's almost a shame that it's coming to an end because, you know, my people are becoming more comfortable with it, I am too, so, you know*'.

Difficulty using the CHR platform

Technical and device-related issues: Patients indicated a preference for using their computer instead of a tablet and reported technical issues, with one female patient saying, '*If it was on my own computer, I [would] feel easier. Because it would have been only one computer and that is all….*' Another patient (male) spoke about difficulties with operating the tablet, 'I *can't get mine to work so I don't know if it [the tablet device] works or not*'. HCPs expressed concerns with the tablet's touchscreen. One female HCP said, '…, *I found the touchscreen not that great so I always reverted to using the mouse but that took me a while to figure that out…*' Some found using the technology to be challenging, exemplified by a female HCP who said, '*It did take a while to learn this interface. So, we had to press on various buttons to see where the patients were or how to send a questionnaire…*'

Concern about privacy and confidentiality: HCPs were concerned about seeing a complete list of patients within their site/team on the interface instead of the patients they were assigned to. Although they often covered for each other, and only accessed primary patient information, they preferred only to see their primary patients. A statement demonstrating this concern for privacy and confidentiality included: '*I think that is a very valid point, why should I see your [referring to colleagues] patient list at all?*' (Male HCP).

Suggestions for further modifications

Modifications to features and functionalities: Patients suggested modifications that could be made before the platform is rolled out in a larger scale study. One suggestion from the patient group was to allow users two-way involvement with the CHR platform, such as to initiate communication and set prompts/reminders for things like medications, electronic messaging, and scheduling regular contact with their health care providers. Patients did not like that the system had much of these functions originate with the staff, and it was more difficult to originate from the patient. One female patient stated: '*if you have a list of did you eat, did you …take your meds on time… because when you are working in the house, and you have all kind of the situation, sometimes you forget*'.

HCPs also suggested that the platform could be enabled for use on other devices such as a workplace computer/email for prompts and alerts: '…, *if they are going to send us an invite, that system should generate an email not only through input health (CHR platform) but to our (hospital) email address, right there is a message waiting for you*' (male HCP).

Enhancing accessibility for patients with visual and movement difficulties was another recommendation. One female HCP said, '*Uh, I have one lady that has macular degeneration, and that's been a deterrent for her, plus she has high anxiety, but um I would say that's the biggest deterrent. So, I don't know about like magnifying it [tablet screen]*'.

Modifications for addressing concerns about confidentiality: To address staff seeing patients who were not their primary clients on the CHR platform, Input Health, a company that owns the CHR platform, provided a link to a website showing how to "tag"/"filter" out non-primary patients. These strategies will be included in future healthcare provider training on using the CHR platform. Modifications are also underway to make it easier for patients to initiate functions.

Discussion

This study examined the views of patients and staff regarding the benefits and difficulties associated with the implementation of TELEPROM-G along with potential further modifications on the platform. The study results showed that the use of CHR platform has numerous benefits, such as enhanced communication with patients, and user-friendliness. HCPs believed that such videoconferencing and CHR platform related benefits helped patients to feel more connected and supported. Our findings also suggest that the videoconferencing and CHR platform is effective in reducing travel time for staff and patients and could reduce numbers of missed appointments. These findings support previous evidence; which indicated that the use of telehealth has potential for lessening the costs of travel, accommodations, lost time and physical limitations while maximizing community-dwelling patients' supports for accessing to family, friends, nurses and other care providers among [28]. An unanticipated finding was that two-thirds of patients already had a Wi-Fi connection in their homes, which potentially supports the adaptation of video conferencing and CHR platform among this population.

The study findings demonstrated difficulties that suggest telehealth intervention, such as videoconferencing and CHR platform, may be more successful if it is connected to patient's phones and tablets to increase accessibility. The findings are consistent with Vassilev et al. [29], who suggested that successful telehealth interventions should able to embrace everyday life and be well-suited to patients' existing environment, skills, and capacity. However, both HCPs and patients experienced some technical issues, including difficulties logging into the platform and accessing the platform webpage; unfamiliarity with the tablet system for those who were used to a personal computer; and problems using the touchscreen, especially for patients with visual and/or movement impairments. Most issues were resolved over the phone or via the on-line technical help messaging system within the CHR. Increased technical support and training for users could potentially alleviate these issues in a more extensive study or large-scale clinical adoption. Future studies may also benefit from having a dedicated member of the research team on call to provide technical support.

The focus groups provided valuable information to guide

modifications to the tablet features and functionalities. Two-way involvement with the CHR platform would be required to enable patients to initiate communication, such as messaging and complete some questionnaires (e.g. GDS) with more autonomy. Previous studies [30], however, caution against patients' independent completion of mood scales due to lack of appropriate medical assistance and rigorous evidence on potentially harmful effects of electronic mood self-monitoring; including the exacerbation of depressive symptoms. Exacerbation of depressive symptoms is possibly due to negative processing bias induced by a daily confrontation of depressive symptoms, which may increase fear of not recovering [31].

Conclusion and Limitations

Notwithstanding, there is potential for increased communication functions and enabling self-completion of select questionnaires to enhance the delivery of mental health services among community-residing older adults. The length of the intervention phase (six months) presents a limitation, as this is unlikely to be long enough to observe changes. Additionally, the use of scripted psychosocial, educational materials, such as tips for dealing with some depressive symptoms, would have improved the study participants' experience.

Implications

The TELEPROM-G study demonstrated implementing telehealth, videoconferencing and CHR platform for older adults with depressive symptoms living in the community, and that HCPs and patients felt that communication between them was improved as a result. Our findings contribute to evidence around perceived benefits, difficulties, and feasibility of the implementation and use of videoconferencing and CHR platform for mental health care delivery. The findings will inform future use of the CHR platform, potentially in more extensive cohort studies across multiple sites.

Disclosure of Interest

A.F. receives grant funding from CIHR, Brain Canada, NIH, PCORI, and the Alzheimer's Association. S.R. receives salary support from the Fonds de Recherche Québec Santé and an investigator-initiated research grant from Dialysis Healthcare.

Funding

Ethical Approval

The ethics committee of the Western University Human Sciences Research Ethics Board and the Clinical Research Impact Committees of the two participating hospitals approved the study (REB number: 107959).

Author Contributions

C.F. conceived the study, the proposal, and overall coordination of the study, including leading the focus groups from which the data of this paper is drawn. A.V. and AMB were involved in protocol development and implementation to practice. R.B., J.F., WI, ML, DLJ, AR, MC, F.N., AJF, K.L., KLC, S.J., and B.H. assisted in qualitative analysis, literature review and development of the initial draft of the paper. TO and JPR participated in qualitative analysis and protocol development.

Acknowledgements

References

1. Keyfitz N, Flieger W. World population growth and aging. University of Chicago Press Economics Books, USA. 1991.

2. Statistics Canada. Census Profile, 2016 Census.

3. Public Health Canada. The chief public health officer's report on the state of public health in Canada: Growing older-adding life to years. 2010.

4. Bowles KH, Pham J, O'Connor M, et al. Information deficits in-home care: a barrier to evidence-based disease management. Home Health Care Manage Prac. 2010;22(4): 278-285.

5. Naylor MD. Advancing high value transitional care: the central role of nursing and its leadership. Nurs Adm Q. 2012;36(2):115-126.

6. Stevenson L, McRae C, Mughal W. Moving to a culture of safety in community home health care. J Health Serv Res Pol. 2008;13:20-24.

7. Canadian Institute of Health Information. Health care in Canada, 2011: A focus on seniors and ageing. 2011.

8. Turcotte M. Persons with disabilities and employment. Statistics Canada 2014. 2014.

9. Blazer DG, Moody-Ayers S, Craft-Morgan J, et al. Depression in diabetes and obesity: racial/ethnic/gender issues in seniors. J Psychosom Res. 2002;53:913-916.

10. Buigues C, Padilla-Sánchez C, Garrido JF, et al. The relationship between depression and frailty syndrome: A systematic review. Aging Ment Health. 2015;19:762-772.

11. Gum AM, Cheavens JS. Psychiatric comorbidity and depression in seniors. Curr Psychiatry Rep. 2008;10:23-29.

12. Harpole LH, Williams Jr JW, Olsen MK, et al. Improving depression outcomes in seniors with comorbid medical illness. General Hospital Psychiat. 2005;27:4-12.

13. Lohman M, Dumenci L, Mezuk B. Depression and frailty in late life: Evidence for a common vulnerability. J Gerontol. 2016;71:630-640.

14. Martel L, Belanger A, Berthelot J. Healthy aging: The determinants of aging without loss of independence among older Canadians. In: Report on the Demographic Situation of Canada 2002. 2006.

15. Latham LP, Ackroyd-Stolarz S. Emergency department utilization by older adults: a descriptive study. Can Geriatr J. 2014;17:118-125.

16. Dorsey ER, Topol EJ. State of telehealth. New England J Med. 2016;375:154-161.

17. Choi NG, Marti CN, Bruce ML. Six-month post-intervention depression and disability outcomes of in-home telehealth problem-solving therapy for depressed, low-income homebound older adults. Depress Anxiety. 2014;31:653-661.

18. Lichstein KL, Scogin F, Thomas SJ. Telehealth cognitive behavior therapy for co-occurring insomnia and depression symptoms in older adults. J Clin Psychol. 2013;69:1056-1065.

19. Gardner MR, Jenkins SM, O'Neil DA, et al. Perceptions of video-based appointments from the patient's home: A patient survey. Telemed e-Health. 2015;21:281-285.

20. Russell TG, Gillespie N, Hartley N, et al. Exploring the predictors of home telehealth uptake by elderly Australian healthcare consumers. J Telemed Telecare. 2015;21:485-489.

21. Higginbottom GM, Pillay JJ, Boadu NY. Guidance on performing focused ethnographies with an emphasis on healthcare research. The Qualitative Report. 2013;18:1-16.

22. Knoblauch H. Focused ethnography. Forum: Qualitative Soc Res. 2005;6:1-15.

23. Walsh KM. Disciplined silence: A focused ethnography of exemplary emergency nursing practice. 2009.

24. Tombaugh TN, McIntyre NJ. The mini-mental state examination: A comprehensive review. J Am Geriatr Soc. 1992;40:922-935.

25. Yesavage JA. Geriatric Depression Scale. Psychopharmacology Bulletin. 1988;24(4):709-711.

26. Leininger MM. Ethnography and ethnonursing: Models and modes of qualitative data analysis. In: Leininger MM (Eds.), Qualitative research methods in nursing. Orlando, FL: Grune & Stratton. 1985; 33-72.

27. Graneheim U, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse education today. 2004.

28. Sevean P, Dampier S, Spadoni M, et al. Patients and families' experiences with video telehealth in rural/remote communities in Northern Canada. J Clin Nurs. 2009;18(18):2573-2579.

29. Vassilev I, Rowsell A, Pope C, et al. Assessing the implement ability of telehealth interventions for self-management support: A realist review. Implement Sci. 2015;10(1):59.

30. Faurholt-Jepsen M, Munkholm K, Frost M, et al. Electronic self-monitoring of mood using I.T. platforms in adult patients with bipolar disorder: A systematic review of the validity and evidence. BioMed Central Psychiat. 2016;16:1-14.

31. Faurholt-Jepsen M, Frost M, Ritz C, et al. Daily electronic self-monitoring in bipolar disorder using smartphones–the MONARCA I trial A randomized, placebo-controlled, single-blind, parallel-group trial. Psychol Med. 2015;45:2691-2704.

*Correspondence to:
Cheryl Forchuk
Mental Health Nursing Research Alliance
Lawson Health Research Institute
Parkwood Institute
Canada
Tel: 519-667-6649
E-mail: cforchuk@uwo.ca