

Multi-site videoconferencing for home-based education of older people with chronic conditions: the Telehealth Literacy Project

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Summary

We examined the acceptability of multi-site videoconferencing as a method of providing group education to older people in their homes. There were 9 groups comprising 52 participants (mean age 73 years) with an average of four chronic conditions. Tablet computers or PCs were installed in participant's homes and connected to the Internet by the National Broadband Network (high-speed broad band network) or by the 4G wireless network. A health literacy and self-management programme was delivered by videoconference for 5 weeks. Participants were able to view and interact with all group members and the facilitator on their devices. During the study, 44 group videoconferences were conducted. Evaluation included 16 semi-structured interviews, 3 focus groups and a journal detailing project implementation. The participants reported enjoying home-based group education by videoconference and found the technology easy to use. Using home-based groups via videoconference was acceptable for providing group education, and considered particularly valuable for people living alone and/or with limited mobility. Audio difficulties were the most commonly reported problem. Participants connected with 4G experienced more problems (audio and visual) than participants on the National Broadband Network and those living in multi-dwelling residences reported more problems than those living in single-dwelling residences. Older people with little computer experience can be supported to use telehealth equipment. Telehealth has the potential to improve access to education about chronic disease self-management.

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Introduction

Chronic disease self-management (CDSM) programmes designed for groups of patients appear to be more successful than those targeted at individuals.^{1–3} CDSM programmes using group education have been effective in improving patient outcomes for hypertension, diabetes and heart disease.⁴

Increasing pressure on healthcare professionals' time has reduced the opportunities to talk to patients about their condition, in order to enhance their self-management skills.^{5,6} Instead, patients are often given written materials containing self-management information, which may disadvantage those with lower health literacy levels. Group-based interventions can be effective, by educating patients simultaneously and providing important peer support.^{5,7} However, there are various barriers to operating group-based programmes, both in the community and in routine clinical settings. Problems such as providing education at convenient times and locations, lack of transportation, fear of meeting new people, and lack of perceived benefit can all affect the ability to recruit patients.^{8,9} Some of these problems might be overcome by using videoconferencing to run group-based programmes. However there is limited evidence about the

use of videoconferencing for groups in telehealth programmes.¹⁰

Studies which have used videoconferencing for group education have reported high rates of user satisfaction^{11–13} and improved clinical outcomes.^{11,14} In one study, participants preferred to take part in the group via telehealth rather than travelling to the healthcare provider.¹² These studies delivered group education to participants situated in local health care facilities.^{11,12} Few studies have

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examined the delivery of group education to the home via videoconferencing. This may allow the delivery of health education and also enable older people to connect with others in similar circumstances.

Telehealth Literacy Project

The Telehealth Literacy Project (THLP) project was part of a Feros Care telehealth project, My Health Clinic At Home (MHCAH), based in a rural town in Northern New South Wales. Telecommunication was provided by the National Broadband Network (NBN). Community living participants aged 49–93 years who had enrolled in the MHCAH project were invited to take part in the THLP. Participants with cognitive impairments were excluded. From February to June 2014, MHCAH participants were invited via newsletter and letter to take part in the THLP, a five-week group education programme focused on health literacy and CDSM skills.

The THLP project was implemented in two waves, from March to May 2014, and from May to June 2014. Participants were allocated to sub-groups using the Health Literacy Questionnaire,¹⁵ which grouped people with similar health literacy levels according to nine domains. Participants were allocated regular times each week to be at their videoconferencing device, and were contacted by telephone the day before each meeting as a reminder. An IT specialist connected the participant's videoconferencing device to a virtual room with the course facilitator. Participants could see and hear other group members and the facilitator in real-time. Different aspects of health literacy and CDSM were discussed each week. The facilitator shared slides and videos with participants to promote discussion. Participants were encouraged to contribute to discussions by sharing knowledge and experience of living with chronic conditions. During the education session, an IT specialist was in the same room as the facilitator to remotely access participants' videoconferencing devices and solve IT difficulties.

In each participant's home, a Wi-Fi router was connected to a network termination device providing either NBN or 4G Internet access. The videoconferencing devices were a tablet computer or a PC, with high definition (HD) 720p cameras for videoconferencing. Secure videoconferencing was used to transmit HD video to participants and facilitator. Technical installation and support involved both on-site and remote support. The facilitator was situated at the Feros Care head office in Coolangatta, Queensland and used the Lifesize videoconferencing platform.¹⁶

The present study examined the acceptability of multi-site videoconferencing as a method of providing group education to older people in their homes.

Methods

A multi-method qualitative descriptive design was used to evaluate the acceptability of the Telehealth Literacy

Project. Approval for the study was obtained from the appropriate ethics committee.

Measures

Three evaluation approaches were used: semi-structured interviews, focus groups and a journal detailing the THLP implementation. The course journal was maintained by the course facilitator with details of attendance, technical problems, group processes and points of interest.

Interviews and focus groups were conducted after the THLP videoconferences had ended. Some participants lived alone and some lived with others. Sixteen semi-structured interviews were conducted: 10 interviews were one-to-one; two interviews were with couples who had both participated and two interviews were with couples where only one person had participated. Three focus groups were conducted: one with five participants via videoconferencing; one with four participants via videoconferencing and one with three participants face-to-face.

In the interviews and focus groups participants were asked open-ended questions about their experience of the THLP. Questions covered the themes, using the technology, content of the education programme, effects on social networks, health improvements and effects of participating in the THLP.

Data analysis

All interviews and focus groups were recorded and transcribed verbatim. Field notes were written after each session. The transcripts were analysed separately for each focus group. Data from the first and second wave were pooled using Nvivo 10 software and analysed using content and thematic procedures.¹⁷ Each transcript was coded with short phrases describing aspects of using videoconferencing for group education.

Results

Of the 139 MHCAH participants invited to take part in the THLP, 52 participants (37%) opted to participate (Table 1). Their mean age was 73 years and they reported a mean of four chronic conditions. Thirty-two were connected by NBN, 18 by 4G and two switched from 4G to NBN during the study.

Forty-four group videoconferences were conducted, including three focus groups. The number of participants was: one group with 2 participants; 8 groups with 3 participants; 12 groups with 4 participants; 9 groups with 5 participants; 11 groups with 6 participants and 1 group with 7 participants. Quotations illustrating the main findings are shown in Table 2.

The codes most consistently reported and the themes from the data were: use of videoconferencing for a multi-site connection; connection problems encountered; being part of a home group via videoconferencing;

Table 1. Participant demographics (n = 52).

Characteristic	Value
Mean age (years)	73
Mean number of chronic conditions	4
Gender	
Males	24 (46%)
Females	28 (54%)
Living circumstances	
Lives alone	18 (35%)
Lives with family	34 (65%)
Lives in Coffs Harbour area	49 (94%)
Lives on Gold Coast	3 (6%)
Health insurance	
Private health insurance	21 (40%)
No private health insurance	27 (52%)
Unknown	4 (8%)
Highest level of education	
Primary School	1 (2%)
High School not completed	19 (37%)
High School completed	10 (19%)
TAFE/College	11 (21%)
University	9 (17%)
Unknown	2 (4%)
Connectivity	
Connected via NBN	32
Switched from 4G to NBN during THLP	2
Connected via 4 G	18

meeting new people via videoconferencing; communicating via videoconferencing; acceptability of videoconferencing for home-based group education.

Multi-site videoconferencing

(a) Participant data

Overall, the participants found videoconferencing enjoyable and easy to use. Some commented on the 'wonder' of the technology, i.e. being able to view and speak to a group from their home. Participants varied in their experience of using computers prior to the MHCAH, but only a few had experience of videoconferencing using Skype.

(b) Journal data

Participants were asked to be ready to join the session about 15 min before the start time. During this time, an IT specialist remotely connected their devices into the virtual room, one-by-one. IT problems were rectified as people were connected, instead of trying to troubleshoot difficulties with multiple connections. A button was installed on the videoconferencing device for participants in the second wave to enable self-connection to the virtual room. However this was discontinued, when on four

occasions participants connected themselves into the virtual room when another group was taking place or when there was no-one in the virtual room.

Connection problems

(a) Participant data

Several technical problems were encountered, including loss of connection, poor audio quality and difficulties with headphones and microphones. Participants connected via 4G reported more inconsistent connectivity compared to those connected via the NBN. Those living in rural multi-dwelling residencies reported the most severe problems compared to those connected via 4G in an urban area. Two rural 4G participants dropped out of the programme because connectivity was too poor to continue. The most commonly reported problems for people connected via NBN were audio difficulties, sound fading in and out, and time delays. The few visual problems reported concerned difficulties in viewing participants' faces due to poor lighting in participants' homes.

(b) Journal data

The technical difficulties decreased over time and fewer interventions were required by the IT specialist. Many problems were resolved by the IT specialist remotely connecting to the home videoconferencing device or talking the participant through the problem being experienced. When the problem could not be resolved remotely, a home visit by a locally based IT specialist was required. A total of 39 technician call-outs were made during the first wave of the THLP. This included approximately 22 visits to deliver headphones, which greatly improved audio quality. During the second wave approximately 20 technician call-outs were made, 10 of which were to deliver headphones. The figures are approximate because the technician may have recorded one call-out when visiting more than one participant if they were in close proximity.

Home-based videoconferencing groups

(a) Participant data

Participants reported that they enjoyed being part of a group via videoconferencing. The most valued aspect was connecting with others in similar circumstances and listening to how they coped with their condition in the context of their everyday lives. Being part of a group enabled participants to learn, exchange information, talk with others and feel that someone else cared. Participants commented on feeling inspired by others in their group who had more severe symptoms or conditions. They perceived that being part of a group made them reflect more on managing their health problems.

Participants considered that connecting via videoconferencing groups would be particularly valuable for people

Table 2. Participant quotations illustrating the main themes.

Theme	Quotations
Using videoconferencing for a multi-site connection	The equipment, I find, is very easy to use. (JC) I've changed from my initial reaction . . . [it's] fantastic the other day, when I rang I used the direct video to you. That was interesting. But that is something that the young ones just take for granted. (PL) The technology's easy – yes, very much so. (JM)
Connection problems encountered	I did have [problems] when I first started, especially with the 4G. But when I turned over to the NBN, it's a lot better because it's more fluid; it wasn't breaking. I think the very first conference [prior to the THLP] I had I missed most of it because the 4G fell out. (SB) They rang me up one day and said did I want to go onto the next programme? I said no; it wasn't worthwhile. I was interested. I wanted to go on and watch and listen, but I thought it's not much use when you can't understand what's going on. Everything comes through so slow on the computer; I couldn't understand a lot of it, and that's no good. You've got to have it so that you can keep up. (BT) I got on it yesterday, and everything went right. I went to get on it today, and the damn thing's carrying on, so I thought, "No, I'm not going to do it." (LG) It was probably a bit frustrating for me, because of the breakup all the time, and I couldn't hear actually what people were saying. I could hear the blonde lady. (GF)
Being part of a home-based group	I get myself isolated sometimes, too, which is my own doing because of my depression but, other than that, I've enjoyed talking to the group. (SB) If you get ones like D and B, they were easy to talk to and friendly, you know? . . . You felt quite comfortable talking to them. (JC) I had empathy with the others in the group. (JM) It felt nice meeting other people having problems the same as you've got, or similar. But [name], the one that had polio, she was marvellous. I thought she was absolutely fabulous, because she looked in a different way . . . She gets up and goes on, and I think that's fabulous. (LC) Knowing that there are people out there, and we can talk. How many people sit at home and are going through all these things, like we're all going through, and they think, "No one really cares. Why should we bother?" But, now, we're here. We all get on there, and we talk, we have a joke, we giggle. It's wonderful. (DL) The best benefit for this is just to be in a touch with a health professional and other people in the same boat. It helps you perhaps to digest information and gives you a bit more interest in talking about your health. Because none of us really like talking about our health much. I think it focussed people up a bit. (PL)
Meeting new people via videoconferencing	I thought we'd established a sort of little community there, and I really wanted to meet C face to face. (JC) I think, when you first go into a room or conference, you're always very reticent to say anything and do anything. The first week would've been like that. But as time progresses, whether it's during the day or over the weeks, you tend to relax and become more forward with what you want to say. And not think they don't want to listen to this. It's not interesting for them. It then becomes easier – because you get to know the faces and you can read faces and body language . . . the telephone would be a complete barrier. But it [videoconferencing] opens you up more. (JB) I think it's really interesting. When you talked to somebody that you got to know after a few weeks. (HC)
Communicating in a group via videoconferencing	I don't think I'm a good speaker at all. I can't find the words any more. The old brain's sort of shutting down . . . I found other people contributed better. Not better – had a lot more to say. (SS) I found it good once I got used to the fact that I'd got to put my hand up and I couldn't just open my mouth and spill out. I thought it was good because then we weren't all talking together. (JC2) Only one person could talk at a time, that sort of thing. When you can talk one to one, it's alright. But if you've got two or three, that's when I get very confused. If I get in a crowd and this one's talking and that one's talking and you're trying to pick up a bit of the conversation, that's when I get very confused. I've got to be more or less one on one all the time. (BT)
Acceptability of home-based group education for older people	I think it's marvellous – it's really useful information and I really enjoy seeing everyone (LG) Yes, it worked. I just thought perhaps there wasn't enough time. I would have liked time to exchange and for me to say to the [name] that got the computer, I'm sure you'll enjoy it, to encourage her to use it . . . [groups] could be focused towards health or it diet or any subject that you felt that would get them actively involved. (FD)

(continued)

Table 2. Continued.

Theme	Quotations
	<p>I never thought it would ever be possible that I could sit in a room here and see three or four people in other homes talking to each other. I thought that was marvellous. They can talk to people; they don't have to leave their homes if they don't want to. I really think it is the way to go. (BT)</p> <p>Personally, I prefer direct contact. I don't think that in the long run I could enjoy conferencing. (WC)</p> <p>[If we had met by telephone] I don't think it would've been anywhere near as good. I think this is a whole different ballgame to just talking on the phone. It's much better. (PL)</p>

who lived alone. This was confirmed by those living alone who reported that on some days they had little or no contact with others. For some of these participants, talking with others was the most important aspect of taking part in the sessions.

(b) Journal data

Humour helped to build cohesion in the groups. The groups that included couples often provided a higher degree of humour, with couples “sparring” off each other. Groups with consistent and stable membership appeared to develop a level of cohesiveness by week 3. Cohesiveness was noted by conversation that demonstrated familiarity and flow, empathy shown to each other and questions asked, building on information shared from previous weeks.

Meeting new people via videoconferencing

(a) Participant data

Participants valued meeting new people, particularly if they had recently moved to the area and did not have extensive networks, had limited mobility and/or spent most of their time in the house or were living alone. Some participants were involved in groups, such as Probus or Rotary. For them, the opportunity to discuss health problems with others with long-term illnesses was more valued than meeting new people.

Participants who suffered from depression or anxiety reported that being in a group via videoconferencing was easier than being in a face-to-face group. They felt more at ease and less overwhelmed when meeting new people. Two participants who reported disliking face-to-face groups went on to organise a face-to-face meeting with others in their group.

(b) Journal data

Each group differed in how participants initially interacted with each other. Those who easily initiated conversation with others were identified and in subsequent sessions were the first participants connected to the virtual room. As the weeks progressed, participants in groups with consistent membership developed high levels of familiarity. At the beginning of each session confidentiality and

videoconferencing etiquette were discussed. On two occasions participants disclosed very personal details. One participant contacted the facilitator after the first week to express concern with another participant's videoconferencing etiquette.

Communicating via videoconferencing

(a) Participant data

Participants indicated wanting to contribute to the conversation by briefly raising their hand, and the facilitator would then invite them to comment. All felt that this was an acceptable way to facilitate discussion.

Some participants commented on feeling nervous at the beginning of the project because they were inexperienced in videoconferencing and were unsure what to expect. However by the end, all participants were confidently contributing to the conversation and were able to use the headphones and microphones. Two participants felt they did not contribute enough to the discussion.

(b) Journal data

As the programme progressed, participants became familiar with the process of contributing to the conversation. Discussions increased in fluidity and one participant who often talked over others in sessions 1 and 2, remembered to adhere to videoconferencing protocol. Session times became longer due to increased discussion amongst participants. Sessions lasted between 45–105 min in duration.

Acceptability of group education

(a) Participant data

Participants reported that home-based group education via videoconferencing for older people was acceptable when the technology worked well. Being able to look into others' homes was not a concern for most. Two participants reported concerns about others' perception of their home. The benefits reported included feeling more relaxed, more convenient, not needing to organise transport and not feeling overwhelmed compared to a face-to-face-group. All participants reported that group education via the telephone would not have worked as well. The telephone was considered a barrier. Videoconferencing enabled them to

see others' faces, body language and reactions which added familiarity to the group.

(b) Journal data

The acceptability of group education by videoconferencing was confirmed by the participants' continued engagement in the project. The following factors all demonstrated the acceptability of the THLP: weekly attendance; sharing information; providing empathy; encouragement and support; reporting improvements in health behaviours; concern for non-attendees; disappointment when the project concluded or if technical difficulties prevented inclusion and suggestions for further content. Two participants withdrew from the sessions, one due to technical problems and the other due to a dislike of talking about his health.

Discussion

The present study assessed the acceptability of home-based group education via videoconferencing for older people living with chronic conditions. The participants found the technology easy to use, as has been found in previous studies.^{18,19} An IT specialist was able to resolve problems by remotely connecting to the videoconferencing device or giving instructions to the participant. Over time, technical problems decreased, partly because participants became more experienced with the equipment and how to use it. Previous studies have cited low computer skills as a barrier to telehealth implementation.²⁰ However, our study confirms that older people with little or no previous computer experience can be supported to use telehealth successfully.²¹

Connecting groups of people in home settings provides a context which educators have little control over. Videoconferencing equipment needs to be located in areas which provide good lighting, comfort and privacy. Home-based group meetings for older people require less formality than is recommended in current videoconferencing guidelines, which have been developed primarily for workplace meetings.²²

Older people highly valued being able to connect with others in similar circumstances from their home. Although it is well accepted that sharing experiences develops a perception of peer-support,²³ the use of group videoconferencing to overcome social isolation and develop social networks is an area that has received little attention. Government policies are shifting to focus on older people ageing in place, rather than entering institutions.²⁴ More older people will be living alone and/or with limited mobility and will be at risk of social isolation.^{25,26} Group videoconferencing might offer a means of overcoming this problem.

Group settings are effective in providing CDSM¹⁻³ and have the potential to provide cost effective models of care, such as shared medical appointments.^{27,28} However, there are barriers to providing group education.^{9,8} Telehealth

could overcome some of these barriers by enabling people to take part in group education from their home, particularly those living in rural areas, with limited transport, reduced mobility or those who fear meeting new people.

Security and privacy concerns have been highlighted as a barrier for delivering telehealth,²⁰ but similar to other findings these were not confirmed in our study.^{29,30} However, there were limitations to our study including: participants opting into the MHCAH project may have been early adopters; those who may not have benefited from the THLP were more likely to have dropped out and the small number of participants mean the findings may not be generalisable.

Audio difficulties were the most commonly reported problem. Participants connected with 4G experienced more problems (audio and visual) than participants on the NBN and those living in multi-dwelling residences reported more problems than those living in single-dwelling residences. To ensure retention of participants in videoconferencing programmes, connectivity needs to be reliable. In some circumstances it was necessary for a locally-based IT specialist to resolve problems by a home visit. In a small rural town this was easy to arrange, but would be more difficult over a large area.

As far as we are aware, the present study was the first in Australia to provide telehealth group education via videoconferencing for CDSM in the home setting. Telehealth education is not limited to people who can read and provides the opportunity for those with low health literacy levels to receive education.³¹ Group education via videoconferencing for CDSM has been used successfully in rural Canada using multi-site healthcare facilities.³¹ Our study extends this work by improving accessibility through home access.

In conclusion, home-based videoconferencing group education is acceptable for older people with chronic conditions. Older people with little computer experience can be supported to use the equipment. Using telehealth has the potential to improve access to CDSM group educations.

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