ORIGINAL RESEARCH

Remote participants' experiences with a group-based stroke self-management program using videoconference technology

DM Taylor[1], SD Stone[2], MP Huijbregts[3]

[1]St Joseph's Care Group. Thunder Bay, Ontario, Canada
[2]Department of Sociology, Lakehead University, Thunder Bay, Ontario, Canada
[3]Clinical Performance and Accreditation, Baycrest, Toronto, Ontario, Canada

ABSTRACT

Introduction: Telehealth is an all-inclusive term for the provision of health services using information and communication technology. Videoconference delivery is one form of telehealth whereby a synchronous, two-way audio and visual connection is made between two or more sites. Videoconference is used in remote areas to improve access to healthcare, perform individual clinical assessments and deliver group education. Moving On after Stroke (MOST®) is a group-based, self-management program for stroke survivors and their caregivers, which consists of information sharing, facilitated discussion, goal-setting, and exercise. This program was delivered simultaneously to local participants onsite in Thunder Bay, Canada, and distant participants in smaller, remote communities in Northwestern Ontario using videoconferencing (MOST-Telehealth Remote). The objective of this study was to explore the experiences of remote participants, their perceptions regarding factors that enable or limit videoconference participation, and to obtain suggestions for enhanced delivery of videoconferenced group programs.
Methods: This qualitative study used an interpretive methodology. Semi-structured interviews were conducted in person with remote MOST-Telehealth Remote (MOST-TR) participants within one year post-program. Participants were recruited using purposive sampling and included both male and female stroke survivors and caregivers, those who participated alone and those who participated with others at the remote site. Twenty-seven people were approached, eight declined, and 19 agreed to participate.

The average age of participants was 66.2 years (range 48–84). The interviews were transcribed and coded using NVivo v2.0 (www.gsrinternational.com). Data were analyzed for common categories using qualitative descriptive methods.

Results: All participants valued access to the program without having to travel long distances. They felt safe in discussions and when exercising with the group across videoconference. Many reported 'feeling as if they were in the same room' but also acknowledged that there were limitations to participating via videoconference. Participants recognized a loss of subtleties in communication and the group facilitators found it difficult to discern whether participants were finding the exercises too difficult or too easy. The videoconference medium also limited participants' ability to privately or informally address concerns. Factors facilitating engagement and participation were similar to factors in face-to-face groups. Additionally, the importance of collaboration with onsite coordinators, volunteers, and other local participants was highlighted. Facilitators have the added responsibility of including all participants more explicitly, especially those offsite. Suggestions to improve group cohesion and participation included a preliminary face-to-face meeting with all participants, implementing technical strategies, and ongoing onsite support.

<u>**Conclusions:**</u> For MOST-TR participants, videoconference participation was valuable. Addressing the limitations of videoconference connection and enhanced local support may improve the experience for remote participants in small-group, videoconferenced, self-management programs. Using videoconference technology to participate in existing programs greatly increases accessibility for people living in remote areas.

Key words: Canada, groups, qualitative research, self-management, stroke, telemedicine, videoconferencing.

Introduction

While group self-management programs have demonstrated effectiveness across multiple populations[1-3], geography precludes participation in areas without a critical mass of participants or healthcare providers. Northwestern Ontario (NWO) is one such area. It is sparsely populated (0.45 people/ km^2), with 48% of the population living in remote areas outside of the major city, Thunder Bay (Fig1)[4]. Healthcare human resources are limited, professionals often serve clients spanning the entire continuum of care, and peer support groups are limited. As noted in a report on healthcare in Canada, offering services via telehealth could improve access to care and services in remote areas[5]. Accordingly, the innovative videoconference delivery of the Moving On after STroke (MOST®) self-management program was developed to provide access to a supervised, community-based, self-management program with both group exercise and peer-support for those living in remote communities. This article reports on remote participants' satisfaction with the program, and offers suggestions for improvement.

Telehealth

Telehealth is an all-inclusive term for the provision of health services using information and communication technology. Recently, videoconferencing, a type of telehealth, has been used to deliver caregiver support programs[6-8] and self-management programs for people with chronic illnesses[9,10] and stroke[6,11]. Some of these programs include an exercise component[11,12].

Although videoconferencing has been found to better establish and maintain rapport compared with telephone conversations, it is not equivalent to in-person interactions[13-15]. Healthcare professionals have described benefits of videoconferencing, such as improved access to health services, improved health outcomes, cost-effectiveness, and enhanced social support[14,16,17]. Reported barriers include poor visual representation and 'audio lags'[18,19], the lack of face-to-face presence which prevents usual aspects of communication such as shaking hands or being able to sense smell[20], and the lack of local, onsite videoconference support[13,14,21]. Reported strategies to improve the videoconference experience include[8,18,20]:

- providing an initial face-to-face meeting
- using technological features such as switching between pre-set camera positions and zooming in for close-ups
- enhancing the social and technical role of a facilitator.

Less information is available about patient experiences and satisfaction with videoconferencing, and there are still many knowledge gaps[16,22,23].

Moving on after Stroke (MOST®)

MOST® is a group-based, self-management program for stroke survivors and their caregivers living in the community[24] (Table 1). The program provides information about stroke-related topics and facilitates discussion, problem solving, goal-setting, and self-management skills in a supportive environment[25]. Participation in MOST is associated with improved community reintegration and positive health behaviour changes in stroke survivors[24]. An initial pilot study investigated the feasibility of using videoconference technology between urban centres to co-facilitate MOST[26]. A subsequent study[27], MOST Telehealth Remote (MOST-TR), used videoconference technology to connect facilitators and Thunder Bay participants with stroke survivors at remote videoconference sites in NWO.

Videoconference impact on groups

MOST is delivered in a group format to promote and encourage information sharing, peer support, and connection among participants. The psychological benefits and therapeutic factors of groups include sharing experiences, being motivated by one another, and comparing oneself to others in the group[28]. These group benefits are impacted by the group's cohesion which is in turn influenced by the videoconference environment[28].

The development of group cohesion, peer support, and participant involvement are critical to the success of MOST[24]. As such, an understanding of the unique experience of

remote participants is necessary. The objectives of this research were to explore remote participants' experiences with the MOST-TR group intervention, to identify factors which enabled and/or created barriers to participation, and to learn about participants' perspectives on the technological, educational, and/or interpersonal strategies that may enhance the delivery of videoconference-based group programs.

Methods

Design

This qualitative study used an interpretive methodology[29-34] to identify the experiences of the remote MOST-TR participants. Semi-structured, face-to-face interviews were used. Ethics approval was received from all participating sites.

Participants

Remote participants from MOST-TR were recruited post-program completion. Community-dwelling stroke survivors between 3 and 18 months post-stroke, and their caregivers were recruited to achieve a range of experiences[30,32]; and were chosen from different sites with varying numbers of local participants. Purposive sampling included women and men, younger and older participants, quieter and more active participants, stroke survivors and caregivers, those who completed the program and those who dropped out before completion.

Three phases of recruitment occurred between March and October 2007 in an attempt to reach data saturation. Letters of invitation were sent to 27 potential participants. Those interested were telephoned to arrange an interview. Nineteen people from six communities within NWO participated in this study (Fig1, Table 2). Unfortunately, those who discontinued MOST-TR did not agree to participate in this study. Four of the participants were able to attend one MOST session in person, in Thunder Bay, on separate occasions.

Figure 1: Map of participating Moving On after Stroke Telehealth Remote (MOST-TR) remote sites in Northwestern Ontario.

Data collection and analysis Following informed consent, interviews were conducted at the participants' home in all but four situations. For reasons of mutual convenience, one was held at the interviewer's workplace and three at the remote videoconference site. One stroke survivor–caregiver dyad was interviewed together at the couple's request.

An interview guide was used to elicit perspectives on the group videoconference experience; flexibility allowed for exploration and elaboration of participant experiences[34]. The guide, which was piloted prior to the study and subsequently revised, focused on four areas: (i) previous experiences with groups or videoconferencing; (ii) participation in the discussion portion of MOST–TR via videoconference; (iii) participation in the exercise portion of MOST-TR via videoconference; and (iv) factors enabling or limiting participation in the group (Fig2).

Table 1: Description of Moving on After Stroke Telehealth Remote (MOST-TR) program

Membership and location	• 8-10 stroke survivors and their informal caregivers • Facilitated by two trained healthcare professionals at local site • 4-6 participants at local site, additional 4-6 connected via videoconference from up to 2 remote sites
Number of sessions	• 18 sessions delivered twice a week • 1 hour discussion and 1 hour exercise
Session topics	• Self-management concepts (including goal-setting, exercise, medication, nutrition, daily activities, and responsibilities) • Stroke signs/symptoms and risk factors • Relationship changes • Community resources and opportunities
Technology	• Synchronous audio and video connection • Used Ontario Telemedicine Network broadband width secure Internet Protocol • Continuous presence • Open microphone - no use of mute function • Table microphones at all sites • Camera angles controlled via remote from local site only, pre-set angles allowed for rapid change in focus to show speaker or wide angle to show whole group • Document camera to display visual material rather than flip charts
Onsite support	• Local site coordinators arranged prior to program implementation to assist with local recruitment, distribution of refreshments, participant orientation and safety for the first two sessions, and troubleshooting during the remaining sessions • Local telehealth coordinators at each site provided technical support • Volunteers recruited as required to assist with room set-up and exercise supervision • Refreshments provided during two of the MOST sessions (the same refreshments were provided at each of the sites, catered by the local hospital or health center)

Table 2: Description of participants

Characteristic	Stroke survivors (*N*=12)	Caregivers (*N*=7)	Total participants (*N*=19)
Age (years) – M (range)	67.3 (48-84)	64.4 (48-76)	66.2 (48-84)
Sex, female – *n* (%)	3 (25)	6 (86)	9 (47)
Ethnic background – *n* (%)			
Caucasian	9 (75)	6 (86)	15 (79)
First Nation	3 (25)	1 (14)	4 (21)
Time since stroke (months) M $\pm$ SD (range)	19 $\pm$ 7.15 (7-34)	N/A	–
Time since completion MOST-TR (months) – M (range)	–	–	3.2 (1-15)

M, Mean; MOST-TR, MOST-Telehealth Remote; N/A, not applicable.

1. Have you ever been involved in another education series, support group?
2. Have you ever been involved in another videoconference experience?
3. How did the MOST program compare with these other experiences?
4. Think back to the first day of the session, in September,
    a. There was a site coordinator/volunteer in the room….
    b. Did you find your way to the room…
    c. You met others for the first time…..
    d. Introductions of the group/ purpose of the sessions….
    e. What were your initial thoughts about the videoconference?
    f. About the program?
    g. How did you feel?
5. What things helped you come back for subsequent sessions?
6. Do you feel you got to know and interact with the people in Thunder Bay and the other videoconferenced site the same way as the people in the room with you?
7. Was there ever a point at which you thought of yourself as being in the same room as all the other participants?
8. Do you think you would have participated differently if all the participants and facilitators had been in the same room? For the discussion portion? For the exercise Portion?
9. What did you think of the videoconferencing? Did the videoconferencing seem distracting?
10. How would you feel if a volunteer were available for the program to ….?

    OR IF VOLUNTEER WAS INVOLVED: How did you feel about having a volunteer available for the program?
11. Can you think of anything that would have improved the program as a participant across videoconference?
12. Would you be willing to participate in a group connected via videoconference again?
13. If you could think of something to share with another participant that was beginning the program, what would it be?

Additional question added for Marathon, Fort Frances and Sioux Lookout:

14. One of the other participants has suggested that it would be really beneficial to have one face-to-face meeting where we were all in the same room. What are your thoughts on that?
    a. If that was the case, when do you think that meeting should take place, the first meeting, after we have met via videoconference for a few, middle of the sessions or toward the end?
    b. Do you think that this would be feasible to attend a face-to-face session for both cost and time?

Figure 2: Interview guide.

Interviews were conducted by the first author who had a pre-existing relationship with participants as co-facilitator of the MOST-TR program. Each interview lasted between 30 and 60 min, and was audio-digitally recorded.

Interviews and analysis proceeded according to an iterative pattern, using methods of constant comparison. This involved continuously comparing new information with previously collected data and modifying the interview questions accordingly for ongoing data collection[35]. After each interview, the data were verified with the participant and clarifications made as required. Immediately post-interview the interviewer recorded reflections and attempted to identify possible new patterns.

Interviews were transcribed verbatim, reviewed, and re-read to absorb the data. New data were coded, analyzed, and compared with existing data, and the interview guide was modified to reflect any new patterns or emerging data.

An interpretive, thematic analysis was conducted[29,31,33]. Data were coded using preliminary categories from the interview guide[33] using QSR NVivo v2.0 (www.qsrinternational.com). New categories were created as required. Segments of text were organized by codes across all interviews[29]. Data were retrieved by code and each code was read for patterns[29]. Patterns were then categorized and sorted based on common features emerging from the data[32]. An external committee reviewed the analysis.

Rigour

Integrity of the findings was optimized through written reflection and discussion with study advisors and peers on the investigator's identity and possible biases[36]. This research is fundamentally shaped by the fact that the investigator is a physiotherapist (physiotherapist and related words are official marks used with permission by registered physiotherapists) in stroke rehabilitation and co-facilitated the MOST-TR sessions, from which study participants were recruited.

Results

Most participants offered both positive and negative comments regarding their perceptions about the videoconferenced group experience. As summarized (Table 3) and discussed below, issues included:

- accessibility and distance
- experiences of participation in discussion and exercise across videoconference (including technology experiences)
- experiences of group involvement across videoconference
- suggestions for improvement.

Accessibility and distance

Participants indicated that due to their geographic isolation, they had come to expect that accessing healthcare services required travelling long distances. As one said:

> *I think you have to do it [travel] when you're in remote areas. The videoconferencing is much better than the traveling to Thunder Bay.*

All participants appreciated the ability to participate in the MOST-TR program and recognized that their participation was only made possible by using videoconference technology.

Participation in discussion and exercise across videoconference

Influence of technology: Participants noted that having both visual and oral connection with others was a supportive factor to their participation. All participants appreciated the ability to see the room and the participants on the video screen, but the quality of the video output was not considered comparable to a face-to-face experience. With videoconferencing, facial details and subtle facial expressions were difficult to discern. These visual limitations were especially evident if there had not been a previous face-to-face interaction. In this case, most participants said it was difficult to recognize someone in person for the first time. As one said: '… like even you – when you came in, I would never have recognized you off the TV, in person'.

However, two participants did not experience the technology as making it difficult to recognize people when meeting them in person. At one point they had been able to participate in a session in Thunder Bay and said:

> *Well it was like I already knew you's very [pause]. That's the way I felt, when I walked in, I just felt, like, we were old friends.*

Ten of the 19 remote site participants said they felt as though they were in the same room at least at some point during the program. One participant explained:

> *Oh, I felt like I was right there with yous [pause]. It was good. It was just like we were there. I was amazed.*

Nevertheless, the technology did not allow all remote participants to feel as though they were in the same room as those at other sites. Some felt there was always a distance between the sites, although this did not necessarily impact their ability to communicate with those at other sites. For example:

> *I can't say that we were in the same room, because there'd be talking going on in Thunder Bay, that we didn't know anything about. …I mean there is a distance feeling through telehealth.*

Table 3: Summary of interview findings

Category	Factors enabling participation	Perceived barriers to participation	Overall satisfaction	Suggested improvements/ strategies
Accessibility and distance	• accessibility without traveling long distances	_	• appreciation of opportunity to participate	_
Impact of VC on participation in discussion	• video - as well as audio connection • open microphone, continuous presence connection • site coordinators • feeling as if already met in person • feeling of being in the same room with everyone • easier to talk across VC	• audio lag • visual limitations: chosen camera focus, decreased facial details & expressions, limited ability to transmit feelings and emotions, 'distance feeling' • local side conversations limited feeling of being in same room • more difficult to talk over VC • concern about confidentiality with volunteers	• positive experience • Experience different from face-to-face experience • would have preferred delivered locally face-to-face but understood not available	• use of preset close-ups of each participant so that focus is on speaker • ability to control camera at all sites from host site • better orientation/ set-up of VC equipment during first few sessions • larger viewing screens • more than one participant at each site • facilitators more explicitly invite participants to talk
Impact of VC on exercise participation	• camaraderie benefits of exercising with a group • felt safe	• difficult discerning exercise difficulty by facilitator • limited exercise facilities for walking	• appreciated supervision	• use of volunteers at local sites
Impact of VC on group experience	• met needs for information and support • group benefits achieved, ie empathy, motivation, altruism • felt group connection regardless of age and geographical differences	• videoconference limited perception of group connection • difficulty getting to know other caregivers as well without in-person connection • difficult being a single participant at a remote site	• positive group experience	• encourage more than one participant at each site • one face-to-face meeting toward the beginning and possibly at the end • facilitators do face-to-face assessment

VC, Videoconference.

The videoconference camera limited the visual connection with the whole group and participants' ability to read subtle facial expressions, body language, and gestures. Camera pre-sets zoomed in on the participant speaking; however, adjustments were only possible locally so the participants at the Thunder Bay site were unable to see a close-up of other remote participants. Within the videoconference environment, the camera chose the focus and one participant expressed frustration over not being able to see other group participants.

Participation in the discussion: Most people said that although they were able to participate in the discussion portion of the session, they would have participated slightly differently had they all been physically together. One participant noted:

I find it's funny if I'm here and if you're way out there and someplace, you know, TV and all that… Feels funny talking to, you know a TV? … Talk to the TV and you wish you were there sitting, with all the, seeing everybody.

Another reported that he limited his participation because he felt he was disrupting another conversation: 'Yeah, like, like when I talked to them, that conversation stopped, and I didn't want to do that to them'. Upon further exploration, he felt that more invitation to talk by the facilitators would have made it easier for him to participate.

In contrast, one participant who was able to attend a session in person in Thunder Bay felt it was easier to participate across videoconference and found that she actually participated less in person. So, although most participants said that participating via videoconference limited their ability to participate in discussions, this was not a consistent finding.

Participation in group exercise: Participants reported they were comfortable with the exercise experience and were not concerned about safety. They talked about being motivated by the group and benefitting from the camaraderie despite it being across videoconference. However, one stroke survivor–caregiver dyad reported negative experiences with the exercises across videoconference. This couple was frustrated with the stroke survivor's difficulties following the instructions and keeping up with the group. It is possible similar difficulties could occur in a face-to-face environment; however, across the videoconference, his level of difficulty and associated frustration were not evident to the facilitators and therefore were not addressed. Despite the facilitators' ongoing attention to monitor exercise quality and participant safety, the ability to accurately perceive the level of difficulty and respond to the participants' need for support was limited.

Experiences of group involvement across videoconference: A drawback to using the technology was that side conversations and informal socializing at other sites represented a barrier preventing others from feeling part of a group, regardless of the visual and audio synchronicity. One participant felt he was unable to connect with the group well enough to participate as much as he would have liked. Most participants, however, reported feeling a connection with the larger group despite the geographical separation. As one said: 'I think we were part of that group, even though we weren't in the same room. So I think that worked well'.

Participants felt they could learn and share information with one another and receive support from the group. As one participant said:

Well the knowledge, as well as being able to talk to others, and that's what I found most fantastic, with the, with the MOST group. I thought, you know, there's other people out there that are going through the same thing as I'm going through and, I wasn't alone in this thing. 'Cause I had nobody here that I could talk to, that would understand.

Participants appeared to have made a true emotional connection and expressed ongoing concern for each other. During each interview, many asked about the wellbeing of other participants in the group.

Participants identified that across videoconference they were able to gain hope from one another and were motivated by the group. As one said:

The woman that was going to knit, you know, her aim was to start her knitting again. And you could see that she was quite pleased with herself. Like quite pleased. I, ah, consider that as a, a motivation for the group. Because they hey, you know, that's really positive [pause] I can, I can feed on that. Good things are happening in my group [pause]. It, it, it builds confidence I guess. I don't know.

Several participants compared themselves to other group members and in some cases, this provided a therapeutic value[28,37].

And you know, when you talk to other people, you're, you uh, you see how, what they, how they handle their problems. Yeah, compared to yourself. So it helps to have somebody that's in the same, hm, category as you.

The videoconferenced connection allowed group members to develop a rapport and derive therapeutic benefits, but did not satisfy the desire to meet one another in person. Many study participants articulated a desire to have a chance to meet the group participants from other sites face-to-face at least once.

Suggestions for improvement

Face-to-face connection: After a participant suggested that it would be helpful to have a face-to-face meeting with other members of the group, others were asked for their opinion about meeting in person. Although several raised logistical concerns, all but three of the 16 consulted participants felt that meeting the entire group in person, early in the program, would be beneficial. One even suggested that it would be useful to have another face-to-face session at the end of the program:

> That way uh, when you have uh, when you're done with the teleconference you get to know everyone. Yeah. And then we can have a big celebration that everyone had accomplished their goals and you knew that we got to meet. And it kind of is like a party at the end.

Others made similar comments about wanting an opportunity to talk with one another informally outside of the session. They wanted a chance to socialize and get to know one another better.

Videoconference-specific facilitation strategies: The participants felt that the open microphone strategy (Table 1) facilitated their participation. They commented that background noise from other sites did not disrupt the conversation. The open microphone additionally permitted the facilitators to be aware of and limit side conversations at individual sites. Strategies to limit side conversations included occasional reminders and sometimes humour to cue the participants that everyone was able to hear all the conversations in all the rooms.

Local site coordinators and volunteers: To optimize the videoconference experience of the remote participants, facilitators in Thunder Bay collaborated with local site coordinators and volunteers. All participants agreed that it had been important to have local site coordinators in place. Some felt that the presence of the site coordinators at only two sessions was enough; whereas others wished for more ongoing availability. Aware of the limited healthcare

resources, they suggested that a volunteer might attend regularly to set up the room and be present for the first 10 min of the discussion. As one said:

> You need a physical being there for the first ten minutes at least. After that, you know, you're part of the group … I think, to have a warm body there for the first ten minutes… a warm welcoming, communicative, interpersonal kind of person would be helpful.

Those who had a volunteer at their site appreciated the assistance with exercise and walking safety. Participants with no volunteers at their site were concerned about confidentiality, not knowing who the volunteer would be. In small towns, participants felt the volunteer may limit their willingness to discuss personal issues.

Local participants: Many of the participants would have liked to have had a larger number of people in their local group for more social support, informal conversation outside of the session topic, and ongoing local connection. This was a particular concern for the three who completed the program as sole program participants at their site, and each independently raised the issue. As one said:

> If there would have been another person or two with me, at my meetings [pause] then, it would have been more of a shared experience I think. It's you know, a little bit more personal from that side.

Similarly, one of the caregivers, who participated alongside stroke survivors but no other caregivers, talked about the videoconference format limiting her ability to make more of a connection with other caregivers.

Discussion

This study explored in detail the perspectives of participants regarding their experiences with a videoconferenced group stroke self-management program. Important components of the program were group exercise, discussion of stroke-

related topics, and peer-support. A number of useful findings emerged to consider in future planning of videoconferenced programs. In general, patterns found regarding the satisfaction and limitations to participation across videoconference were consistent with previous reports. This study adds new information; specifically, details from a client perspective regarding: the subtleties lost in communication; the desire for connection to one another as part of a group experience; and the experience of participating in a group exercise program across videoconference.

Participants appreciated the ability to participate in MOST-TR via videoconference, a program that would otherwise only be offered in urban centres with sufficiently large numbers of participants and providers. The participants reported satisfaction with the videoconferenced delivery of MOST-TR and agreed that telehealth was beneficial in that it allowed them to stay in their home community to access health services, gave them access to health information, and meant decreased travel time and costs for them. These are benefits to telehealth that have also been described in existing literature[38]. However, given the opportunity, all the participants would have preferred face-to-face participation in their own community.

The findings of this study indicate that the videoconferenced connection was superior to a telephone connection because it allowed participants to see others at different sites, fostered the feeling of being in the same room, and thus improved their ability to connect with the group.

The findings from this study suggest the possibility of the safe delivery of an exercise class to a group across multiple sites connected by videoconference. This affords new opportunities for isolated areas. The videoconference permitted members to benefit from the group exercise and be motivated by one another. Some participants, however, did identify difficulties participating in the exercises, and it was not always possible for the facilitator to be aware of or satisfactorily address difficulties across videoconference. Although it is possible this would be the same in-person; in

those situations, a facilitator may have been able to identify this more easily and could have more informal opportunities outside of the group to promote a positive experience.

The literature reports conflicting findings with respect to group communication and cohesion using videoconference. Meier examined the ability to develop and maintain a sense of 'groupness' during a business meeting[39,40]. He reported difficulties discerning subtle facial expressions and misinterpreted body language and gaze via videoconference. These difficulties with communication subtleties such as direct eye contact, gaze, gesture, and emotions were also reported by MOST-TR participants. Meier noted that laughter and having fun did not seem to carry over into other locales easily, but this was not the case in MOST-TR[40]. While it is possible that some humour was lost across videoconference, MOST-TR participants described incidents of laughter and humour shared across all sites. These conflicting findings suggest that the group's purpose influences the style of communication, and consequently alter the transmission of laughter and humour.

Most participants found they were able to share their experiences and to benefit from the information and peer support the program offered; however, their participation in the discussion portion of the program was altered by the videoconference connection when compared with an in-person experience. Some, for example, found it difficult to join in to conversations at other sites for fear of 'cutting off' the conversation. One participant required a greater sense of group cohesion to feel comfortable sharing with other group members. Another participant reported feeling more at ease sharing information and participating across videoconference. This is not surprising because the videoconference connection allows a more removed experience whereby one may feel less threatened by others' judgment in view of the physical distance. These types of experiences with videoconferencing have also been reported in other education sessions for patients or caregivers[8].

The majority of the MOST-TR participants thought that the videoconference connection made no difference to their

level of participation and that they were able to participate at the same level as if they were there face-to-face. It is possible that the participants' need and desire for support from others in a similar situation was met with the videoconference format and thus eliminated a need for a more intimate in-person experience. However, participants also said that they would have enjoyed more time for discussion, and some said that they desired more time to socialize informally, share stories and get to know each other.

Participants recommended continuing the use of the open microphone and close-up camera angle strategies to support the flow of the discussion. To use these strategies, the facilitator needs to become technically able to focus and readjust the camera to different pre-set positions while continuing to deliver and facilitate the content of the program. It is critical to co-facilitate in these situations in order to accommodate these additional roles. The present technology limits the ability to control the far-site camera when more than two sites are connected, making the camera angle strategy only available to a local participant. Using the camera remote control was overwhelming for some participants. One possible solution is to have the local telehealth coordinator set pre-set camera angles and orient the local participants to the pre-set positions. These suggestions are useful for future group programming across videoconference.

This study also confirmed the visual restrictions of videoconference as reported in the literature[18,19]. When meeting the group face-to-face, some participants felt as if they had met before; others felt the videoconference representation was limited and this was disconcerting. Participants suggested one of the early sessions are hosted face-to-face for all group members allowing for both an in-person visual connection as well as an informal opportunity for the group to get to know one another. A preliminary face-to-face meeting confirms similar suggestions in tele-psychiatry[20]. The group's suggestion of one in-person session is important because it has been identified that an in-person assessment is recommended for visual accuracy,

rapport building, and prudent for safety in the group exercise. It is possible that this assessment could be performed by local staff, providing an opportunity for increased 'buy-in' and support from the local institution, but this would not satisfy the in-person connection and visual representation for program participants.

Limitations

This study included only participants who had completed the program and had generally positive experiences. Those who did not complete the MOST-TR program, although invited, chose not to participate in this study. The power differential between the participants and the healthcare professional interviewer may further have affected how participants responded to the invitation to participate and their responses to questions during the interview. They may have been reluctant to fully explore the role of the facilitator as a factor in their engagement and participation. The investigator's role as facilitator and enthusiasm for the technology additionally may have had an unintended impact on the participants' comfort sharing their fears, challenges, and barriers to participation. The findings therefore reflect a positive bias of satisfaction with the videoconference connection, group connection, and successful participation in the program.

Although the findings may nevertheless be suggestive of issues for people participating in group-based videoconference programs in general, it is not possible to generalize the findings beyond the study participants.

Conclusion

This study adds to the literature by presenting participant perspectives on the benefits and challenges of participating in a post-stroke self-management and exercise program via videoconference.

Overall, participants in this study were satisfied with the MOST-TR videoconference group experience. They felt the

program increased their knowledge about their condition and assisted with participation in ongoing exercise. They reported being able to connect with the group and to benefit from this connection. The videoconference technology altered participation in the discussion, both negatively and positively. The videoconference environment limited opportunities for group members to connect with one another in informal discussions outside of the sessions. The videoconference environment permitted a safe, motivating exercise environment but limited the facilitator's ability to accurately assess whether participants were struggling to perform specific exercises or were finding the exercises too easy.

This research shows that videoconference technology has the potential to meet the need for community-based programming and exercise for individuals living in remote areas. Both facilitators and participants need to recognize that there are differences between videoconference and face-to-face participation. Future programs may wish to incorporate and strengthen where possible the supportive factors identified in this study, and explore solutions to overcome identified barriers to group videoconference implementation. This may increase meaningful access to group interventions, including social support programs and exercise programs, for residents in rural and remote areas where both patient numbers and healthcare resources are limited.

Acknowledgements

References

1. Corbin J, Strauss A. *Unending work and care: managing chronic illness at home*. San Francisco, CA: Jossey-Bass, 1988.

2. Lorig K, Sobel D, Stewart A, Brown BJ, Bandura A, Ritter P et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Medical Care* 1999; **37(1):** 5-14.

3. Taal E, Rasker JJ, Wiegman O. Patient education and self management in the rheumatic diseases: a self-efficacy approach. *Arthritis Care and Research* 1996; **9(3):** 229-230.

4. Northwest. *Population Health Profile Northwest Local Health Integration Network* (v 2). (Online) 2009. Available: http://www.northwestlhin.on.ca/uploadedFiles/Home_Page/Report_and_Publications/North%20West%20LHIN%20Population%20Health%20Profile%202009%20v.2.pdf (Accessed 7 March 2011).

5. Romanow HR. *Report on the Future of Healthcare in Canada*. Saskatoon, SK: Commission on the Future of Health Care in Canada, 2002.

6. Tran B, Buckley K, Prandoni C. Selection and use of telehealth technology in support of homebound caregivers of stroke patients. *Caring* 2002; **21:** 16-21.

7. Van Ast P. Supporting community carers via videoconferencing. *Journal of Telemedicine and Telecare* 2005; **11(Suppl 2):** S96-97.

8. Van Ast P, Larson A. Supporting rural carers through telehealth. *Rural and Remote Health* **7:** 623. (Online) 2007. Available: www.rrh.org.au (24 January 2012).

9. Chan WM, Woo J, Hui E, Lau WWY, Lai JCK, Lee D. A community model for care of elderly people with diabetes via telemedicine. *Applied Nursing Research* 2005; **18:** 77-81.

10. Po YM. Telemedicine to improve patients' self-efficacy in managing diabetes. *Journal of Telemedicine and Telecare* 2000; **6:** 263-267.

11. Lai J, Woo J, Hui E, Chan W. Telerehabilitation - a new model for community-based stroke rehabilitation. *Journal of Telemedicine and Telecare* 2004; **10(4):** 199-205.

12. Wong YK, Hui E, Woo J. A community-based exercise programme for older persons with knee pain using telemedicine. *Journal of Telemedicine and Telecare* 2005; **11:** 310-315.

13. Birden H, Page S. Teaching by videoconference: a commentary on best practice for rural education in health professions. *Rural and Remote Health* **5:** 356. (Online) 2005. Available: www.rrh.org.au (24 January 2012).

14. Gagnon M, Duplantie J, Fortin J, Landry R. Implementing telehealth to support medical practice in rural/remote regions: what are the conditions for success? *Implementation Science* 2006; **1:** 18.

15. Moehr J, Schaafsma J, Anglin C, Pantazi S, Grimm N, Anglin S. Success factors for telehealth - a case study. *International Journal of Medical Informatics* 2006; **75:** 755-763.

16. Currell R, Urquhart C, Wainwright P, Lewis R. Telemedicine versus face to face patient care: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 2000; **(2):** CG002098.

17. Jennett P, Gagnon M, Brandstadt H. Preparing for success: readiness models for rural telehealth. *Journal of Postgraduate Medicine* 2005; **51(4):** 279-285.

18. Allen M, Sargeant J, Mann K, Fleming M, Premi J. Videoconferencing for practice-based small-group continuing medical education: feasiblity, acceptability, effectiveness, and cost. *Journal of Continuing Education in the Health Professions* 2003; **23:** 38-47.

19. Hettrick C, Bullick T, Nelson T, Munro S, Jamieson J. *The Northwestern Ontario Rehabilitation Network: Final Report*. Thunder Bay, ON: St Joseph's Care Group; 2006.

20. Mielonen M, Ohinmaa A, Moring J, Isohanni M. The use of videoconferencing for telepsychiatry in Finland. *Journal of Telemedicine and Telecare* 1998; **4:** 25-31.

21. Faulkner K, McClelland L. Using Videoconferencing to Deliver a health education program to women health consumers in rural and remote Queensland: an early attempt and future plans. *Australian Journal of Rural Health* 2002; **10(1):** 65-72.

22. Jennett P, Affleck Hall L, Hailey D, Ohinmaa A, Anderson C, Thomas R et al. The socio-economic impact of telehealth: a systematic review. *Journal of Telemedicine and Telecare* 2003; **9:** 311-320.

23. Mair F, Whitten P. Systematic review of studies of patient satisfaction with telemedicine. *BMJ* 2000; **320:** 1517-1520.

24. Huijbregts M, Myers A, Streiner D, Teasell R. Implementation, process, and preliminary outcome evaluation of two community programs for persons with stroke and their care partners. *Topics in Stroke Rehabilitation* 2008; **15(5):** 503-520.

25. Jones F. Strategies to enhance chronic disease self-management: how can we apply this to stroke? *Disability and Rehabilitation* 2006; **28(13-14):** 841-847.

26. Huijbregts M, McEwen S, Taylor D. Telehealth delivery of a stroke self-management program: a controlled feasibility trial. *Physiotherapy Canada* 2009; **61(3):** 210-221.

27. Taylor D, Cameron J, Walsh L, McEwen S, Kagan A, Streiner D et al. Use of videoconference to deliver a self-management program to rural participants with stroke: a pilot study. *Telemedicine Journal and e-Health* 2009; **15(7):** 1-9.

28. Yalom ID. *The theory and practice of group psychotherapy*, 4th edn. New York: Harper-Collins, 1995.

29. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods* 2006; **5(1):** 1-11.

30. Goering PN, Streiner DL. Reconcilable differences: the marriage of qualitative and quantitative methods. *Canadian Journal of Psychiatry* 1996; **41:** 491-497.

31. Hsieh H, Shannon S. Three approaches to qualitative content analysis. *Qualitative Health Research* 2005; **15(9):** 1277-1288.

32. Ohman A. Qualitative methodology for rehabilitation research. *Journal of Rehabilitation Medicine* 2005; **37:** 273-280.

33. Rossman G, Rallis S. *Learning in the field. an introduction to qualitative research*, 2nd edn. Thousand Oaks, CA: Sage, 2003.

34. Wright JG, McKeever P. Qualitative research: its role in clinical research. *Annals of Royal College of Physicians and Surgeons of Canada* 2000; **33:** 275-280.

35. Charmaz K. *Constructing grounded theory: a practical guide through qualitative analysis*. Thousand Oaks, CA: Sage, 2006.

36. Elliot J. The researcher as narrator: reflexivity in qualitative and quantitative research. *Using narrative in social research: qualitative and quantitative approaches*. Thousand Oaks, CA: Sage, 2005; 152-159.

37. Posthuma BW. *Small groups in counselling and therapy*. Boston: Allyn and Bacon, 2002.

38. Jennett P, Yeo M, Scott R, Hebert M, Teo W. Delivery of rural and remote health care via a broadband internet protocol network - views of potential users. *Journal of Telemedicine and Telecare* 2005; **11:** 419-424.

39. Heath C, Luff P. Media space and communicative asymmetries: preliminary observations of video-mediated interaction. *Human-computer Interaction* 1992; **7:** 315-346.

40. Meier C. Doing "groupness" in a spatially distributed work group: the case of videoconferences at Technics. In: L Frey (Ed.). *Group communication in context: studies of bona fide group*, 2nd edition. London: Lawrence Erlbaum, 2003, 367-397.