

## Attitudes Toward Videotelephones *An Exploratory Study of Older Adults with Depression*

*New technology holds promising benefits for at-home care.*

Antonia Arnaert, PhD, MPA, MSN, RN; Jenny Klooster, MSc, BA, RN; and Virginia Chow, MA



The convergence of two phenomena, a rapidly aging population and the dissemination of technological innovations, underscores the importance of adapting technology for older adults' use (Czaja, 2005). Depression is one of the most common and persistent functional disorders in adults older than age 65 (Harris, 2007), affecting up to 15% of the older population (Beekman, Copeland, & Prince, 1999). Depression in late life has also been linked with considerable morbidity and mortality, as well as increases in health care costs (Baldwin, Chiu, Graham, & Katona, 2002). Depression is the leading cause of suicide in older adults and may also lead to their institutionalization (Harris & Cooper, 2006). These findings point to the urgency of making the improvement of depression treatment a priority in mental health services (Paul, Ayis, & Ebrahim, 2006). However, few studies have examined the use of distance technology, such as videotelephones (VTs), in the treatment of depression and the kinds of attitudes that might influence individuals' dispositions to use these tools.

To date, research in the area of information and communication technologies, such as the use of sensors and devices to enhance clients' safety at home (also called "smart home" technologies) (Demiris et al., 2004), provides some information about the attitudes of older adults toward technology. For example, mistrust of automated technology and the attitude that technology has not made life easier still

### ABSTRACT

Although technology holds promising benefits to support older adults at home, attitudes can be a hindrance to the acceptance and use of new technologies. The aim of this study was to explore attitudes of older adults with depressive symptoms using videotelephones (VTs) in their homes. A descriptive design involving 4 participants who received problem solving interventions from a clinical psychologist via VTs was used. Data analysis revealed that the participants' preattitudes were dependent on their active or passive role in the learning process of the new technology. Their postattitudes were classified as ambivalent and positive. Two participants who had a positive attitude toward the VT expressed a positive behavior use.

prevents some older adults from learning about and trying new information and communication technologies (Jessome & Parks, 2001; Jessome, Parks, & MacLellan, 2001). Eagly and Chaiken (1993) stated that attitude, defined as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (p. 1), influences an individual’s openness to accept and use new technology, because attitudes tend to guide behavior (Regan & Fazio, 1977). Although

level of concern for problems that could be alleviated through the use of technology.

Studies on older adults’ attitudes toward VTs in the delivery of telehomecare (Celler, Lovell, & Chan, 1999; Demiris, Speedie, & Finkselstein, 2001) are scarce. Telehomecare has been defined as the use of information, communications, measurement, and monitoring technologies to evaluate health status and deliver health care from a distance to clients at home

## Although some older adults harbor negative attitudes toward technology, many are not technophobes.

some older adults harbor negative attitudes toward technology, many are not technophobes (Brownsell, Bradley, Bragg, Catlin, & Carlier, 2000; Collins, Bhatti, Dexter, & Rabbitt, 1992) and are even receptive to using new technologies (Czaja, 2005; Demiris et al., 2004). Most literature indicates that older adults’ attitudes are modifiable with an increase of exposure and experience (Jay & Willis, 1992), which itself depends on training and awareness of the technology, its purpose, its ability to meet their needs (Gilly & Zeithaml, 1985), and its user-friendliness (Léhoux, 2004). Older adults’ receptivity to technological products is also influenced by variables such as age, gender, education, income, and as mentioned by Zimmer and Chappell (1999), one’s

(Celler et al., 1999). Telehomecare trials among older adults have shown that the delivery of interventions improves a number of outcomes, including the client’s health, level of autonomy, and quality of life (Arnaert & Delesie, 2001, 2007; Bowles & Dansky, 2002; Chumbler, Mann, Wu, Schmid, & Kobb, 2004; Johnson et al., 2001; Savenstedt, Zingmark, & Sandman, 2003), suggesting that telehomecare is a viable alternative to delivering interventions face to face in a primary care setting. This conclusion is also supported by Hunkeler et al. (2000), who found that telehomecare provided by nurses in primary care settings benefits people with major depression or dysthymia. Specifically, telehomecare improves clients’ outcomes of antidepressant

drug treatment. In addition, Nelson, Barnard, and Cain (2003) found that cognitive-behavioral treatment for childhood depression was equally as effective in face-to-face modes of delivery as it was in videoconferencing. Importantly, no differences in the working alliance were found between psychotherapy that was provided face to face, in real-time videoconferencing, or by aural contact (Day & Schneider, 2002). These findings point to the efficacy of telehomecare as a method of delivering mental health care interventions that does not negatively affect the working alliance.

Early VT trials for older adults in England (Collins & Dexter, 1990), Portugal (Pereira, Matos, Purificação, & von Tetzchner, 1991), and Finland (Perälä & Lounela, 1991) delivering different services such as remote advice, counseling, and distance supervision revealed that clients’ being able to see the health care professionals when communicating with them was the strongest predictor of enthusiasm for using VTs. Although nonverbal cues are a part of this simultaneous transmission of live pictures and speech, VTs still do not include all the cues present in face-to-face conversations. Thus, VT communication falls somewhere between telephone and face-to-face conversations (Lipartito, 2003).

Some of the advantages of using VTs, as mentioned by older adults, include its convenience and cost-effectiveness (Menon et al., 2001). For example, clients often report that VTs are good for those who are housebound and disabled and cannot travel, and that they can also save on traveling expenses. With regard to VT usability, opinions were more diverse. Half of the clients in the Finnish trial (Perälä & Lounela, 1991) stated that VTs were easy to use; however, the devices’ user-friendliness is still a concern of older adults, as the majority of the interfaces are designed without consideration of the functional limitations that come with age (Demiris et al., 2004).

Given that technology is not static and that older adults’ exposure and ex-

### ABOUT THE AUTHORS

*Dr. Arnaert is Assistant Professor, School of Nursing, McGill University, Montreal, Quebec, Canada. Ms. Klooster is Public Health Nurse, City of Toronto, Ontario, Canada. Ms. Chow is a doctoral candidate in clinical psychology, Centre for Research in Human Development, Department of Psychology, Concordia University, Montreal, Quebec, Canada.*

*This project was funded by a team grant from the Fonds de la Recherche en Santé du Québec (#25004-2560). An operating grant from the Canadian Institutes for Health Research (MOP-64462) provided funding for the development of the intervention manual and materials and for training of the Depression Care Practitioners. The authors would like to acknowledge the older adults with depression who generously participated in this study and Dr. Jane McCusker and team members at St. Mary’s Hospital Centre, Department of Clinical Epidemiology and Community Studies, for their support in this clinical project.*

*Address correspondence to Antonia Arnaert, PhD, MPA, MSN, RN, Assistant Professor, School of Nursing, McGill University, 3506 University Street, Wilson Hall, Montreal, Quebec, Canada, H3A 2A7; e-mail: antonia.arnaert@mcgill.ca.*

perience with new technologies evolve, the topic of aging and technology will continue to be an important issue in the upcoming decades (Czaja, 2005). With the varieties of information and communication technologies used for telehomecare, it is vital that care providers, policy makers, and system designers gain a better understanding of the attitudes of older adults toward technology. Attitudes are a critical component of usability (Schackel, 1986) and, once understood, may be modified to enhance acceptance of an empirically supported mode of treatment. The aim of this study was to explore the attitudes of older adults with depressive symptoms toward VTs in their homes. Because different terms exist (e.g., *picture-phone*), the concept *videotelephone* as used in this article refers to an audiovisual technological tool for interactive, real-time interpersonal communication.

## BACKGROUND

Project DIRECT (Depression Intervention through Referral, Education, and Collaborative Treatment) (McCusker et al., 2004) was a pilot study to investigate the feasibility of a care management intervention delivered to elderly patients with major depression primarily by telephone versus face-to-face intervention. The intervention was adapted from the IMPACT (Improving Mood-Promoting Access to Collaborative Treatment) study (Unutzer et al., 2002). Under the supervision of a hospital psychiatrist, two Depression Care Practitioners (DCPs)—a specially trained clinical psychologist and social worker—worked together for 8 weeks with the clients and their family physicians to implement a treatment protocol and to deliver a brief problem solving treatment intervention (Hegel et al., 2002).

The current project recruited the psychologist DCP to deliver the same problem solving treatment intervention via VT weekly for 6 weeks to older adults with depression. To develop a working alliance, the first session was conducted in person at

the client's home. Audio and video signals were transferred bidirectionally between the client and the DCP using the public telephone network. The DCP initiated the VT call by entering the client's telephone number. On acceptance, the video connection was automatically activated.

## METHOD

### Design and Data Collection

A descriptive design was used to allow in-depth exploration of the attitudes that 4 older adults with symptoms of depression had toward VTs. The institution's ethical review board approved the project design. Family physicians who had consented to participate in Project DIRECT were sent a letter explaining the study and were asked to identify eligible clients. Following the physicians' responses, the researcher contacted these clients by telephone and informed them about the study and its purpose.

After the clients verbally agreed to participate, they met with the researcher (J.K.) to sign the informed consent form. The researcher collected data from the participants privately at their homes, before and after the 6-week problem solving treatment intervention, in two semi-structured interviews that were audiotaped and lasted approximately 40 minutes each. Questions included:

- What are your feelings about using the VT?
- Have your feelings changed since you used the VT?
- Would you prefer to use the VT further as a method of care delivery?

Sociodemographic information was collected during the first interview, including age, gender, marital status, living situation, employment status, occupation, and computer experience. At this time, the researcher installed the VTs in the participants' homes in a place of their preference, fully explaining how to use the system and providing contact information in the event of technical problems. The researcher transcribed the interviews into verba-

tim transcripts after each interview and coded the information from these and the detailed field notes.

## Sample

A convenience sample of 5 older adults living at home was recruited between July and October 2005 from the control group of Project DIRECT. One participant (S5) withdrew from the study for personal reasons after the first interview. Inclusion criteria were residency in the Montreal region, the ability to speak and read English, being age 60 or older, having at most mild cognitive impairment and no bipolar disease or psychosis, and answering "yes" to at least one of the depression screening questions from the PHQ-2 (Patient Health Questionnaire-2) (Arroll, Khin, & Kerse, 2003; Spitzer, Kroenke, & Williams, 1999):

- During the past month have you often been bothered by feeling down, depressed or hopeless?
- During the past month have you often been bothered by little interest or pleasure in doing things?

The DCP had also conducted an initial assessment of the severity of the participants' depression using the PHQ-9 (Patient Health Questionnaire-9) (Kroenke, Spitzer, & Williams, 2001) after the participants' inclusion in Project DIRECT.

## Data Analysis

Using the comparative method, content analysis was conducted to identify prominent themes in the data (Strauss & Corbin, 1990). With only five VTs available, data collection was limited; however, some themes did emerge on the basis of participants' reports about their attitudes toward VTs. No data saturation was achieved due to the limited sample size. An audit trail was established to keep track of decisions made during analysis. To enhance credibility of the data, informal member-checking with participants was performed. A second researcher (A.A.) addressed interrater reliability by recoding all of the data using the coding guidelines and category definitions developed by the

**TABLE**

**SOCIODEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE**

Variable	Participant				
	S1	S2	S3	S4	S5 <sup>a</sup>
Gender	Female	Female	Male	Male	Female
Age	63	80	67	63	66
Marital status	Married	Widowed	Married	Single	Widowed
Living situation	With husband	With disabled son	With wife	Alone	Alone
Employment status	Retired	Retired	Retired	Full time	Part time
Occupation	Secretary	Unknown	Technician	Technician	Consultant
Computer experience	At work	At home	At work/home	At work	At work/home
PHQ-2 (2 questions)	Yes	Yes	Yes	Yes	Yes
PHQ-9 (depression severity)	Mild	Severe	Mild	Moderate	Mild

Note. PHQ = Patient Health Questionnaire.

<sup>a</sup> Participant withdrew from study after first interview.

main researcher and confirming that the emergent themes were representative of the raw data.

**RESULTS**

The Table provides the participants' sociodemographic characteristics, computer experience, and depression severity. Both male participants (S3 and S4) are or were once technicians and have used a computer at work. Their depression severity was mild (S3) and moderate (S4). The women who had mild depression (S1 and S5) used a computer at work. Participant S2, who was severely depressed, learned to use a computer at home. Analysis of the data resulted in a concept map (Figure) depicting the preattitudes and postattitudes of older adults with depression toward VTs. Data revealed that the preattitudes were dependent on their *active* or *passive* role in the learning process of new technology. Their postattitudes were classified into two groups: *ambivalent* and *positive*, with the two male participants reporting a positive attitude, thus expressing positive behavior use.

**LEARNING APPROACH TO NEW TECHNOLOGY**

The ability to use new technology is affected by one's earlier experiences

(Jay & Willis, 1992). On the basis of the findings that people can adopt a passive or active role in their experiences (Ellis, 1996), participant S1 was categorized as a passive learner, as she expressed no interest in learning new technology. She said:

Well, I'm not that well versed in technology in general; I'm the older generation. I'm the old school, you know... New technology and me, I don't know if I just got in a rut and I'm not interested in learning, but I'm just used to my old habits and that's it.

The remaining participants adapted an active role in the learning process, as they already used new technology in their everyday lives. Participant S2, age 80, said: "I'm putting it [the computer] to good use, and I decided that I'm going to learn how to use the computer, about a year ago."

**Preattitudes Toward VTs**

Participant S1, classified as having a passive role in the learning process, mentioned, "You can't teach an old dog new tricks." She had doubts about the VT and stated:

- The telephone was an adequate means of communication. "I don't think [the VT is] a huge asset. I think just a good voice, a good conversation on the telephone is probably just as

good as looking at somebody talking to me."

- The VT is impersonal. "I think it's a lot more impersonal. I don't think it's the same thing as one-to-one [conversation]."

- The VT is an invasion of one's privacy. "I'm used to talking on the telephone and nobody sees what I'm doing, and all of a sudden I'm going to have to take care that I don't do something that's not quite proper when I'm talking to this phone [the VT]."

- The VT does not replace face-to-face contact. "Here, I could be sitting in my pajamas or whatever doing the interview. I feel when you are depressed, getting up, getting out of the house at times is a lot more beneficial than sitting in your house doing these things [talking over the VT]."

The remaining participants, classified as having active roles in the learning process, reported having no expectations regarding the VT; however, they expressed the following attitudes:

- Eagerness to use. The oldest participant (S2) said, "I take everything by its face value. If I benefit from it, I'll be the happiest person in the world."

- Being afraid at first. Only participant S4 mentioned being afraid at first, although the fear went away when he saw the VT.

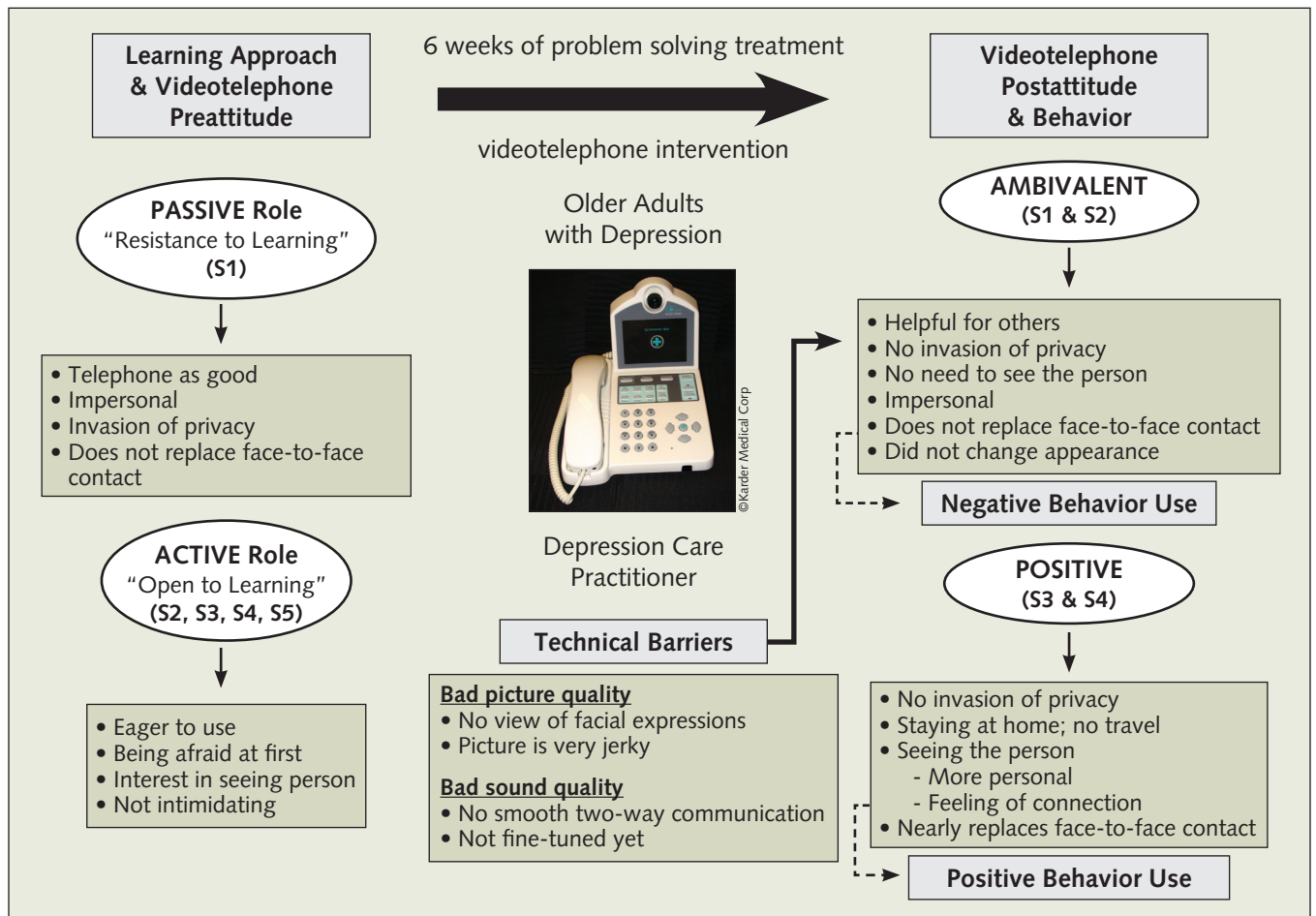


Figure. Concept map of the preattitudes and postattitudes of older adults with depression toward videotelephones (VTs).

- Interest in seeing the person during the conversation. Three participants (S3, S4, S5) stated being interested in seeing the person during the conversation, and participant S3 stated, "It'll be different, because I can see the person I'm talking to, which I've never done before, so that'll be interesting. It's not just like talking and picturing in your mind what the person looks like and what they are doing. I think it will be really cool!"

- Not being intimidated. Although no one in the active group thought the VT would intimidate them, participant S3 mentioned that it was important to meet the DCP in person beforehand. He said, "When I see her [the DCP] on the phone [the VT], it's more like talking to a friend rather than a stranger. I think if it was somebody that I never met and never talked to, I might feel un-

comfortable because I can only see a part of them."

#### Postattitudes Toward the VTs and Behavior Use

After using the VT for the five problem solving treatment sessions, the participants' attitudes were classified as either ambivalent or positive. Both female participants had an ambivalent attitude. This classification was characterized by their feelings about the VT, which included:

- It can be helpful for others, but it was not helpful for them. Participant S2 said, "This is a marvelous, marvelous invention. Whoever invented it deserves a medal. I give them [a] 10 for effort, but not for a treatment session, or anything [the depression] that I have." Similarly, participant S1 stated, "As far as I'm concerned, the VT screen didn't enhance my sessions.

Maybe for some people it would, but to me it wasn't a plus."

- It was not an invasion of one's privacy. Both participants mentioned that the VT did not invade their privacy, as the DCP had been in their homes before. However, participant S1, who unplugged the VT after the second session, said, "It would be different if it [the VT] was revolving around. I can put all my mess in one little corner if I wanted and just fix up the area where the video camera is.... I can sort of control what she [the DCP] is going to see."

- There was no need to see the person during a conversation. They also felt that seeing the person was not a necessity, as participant S1 expressed, "I know how she [the DCP] looks, so I was quite content to talk to her without having to look at her picture all the time."

- It was impersonal. Participant S2 said, "It's very cold. It's like...steel, cold. It has no warmth, it has no personality. It is a machine.... But on the other hand, it is a person, it's true...but not touching, you understand? It didn't give that extra human touch."

- It does not replace face-to-face contact. Participant S1 expressed that an in-person visit is different from a televisit: "With a VT, you don't get the sense of the person being there."

## The combined delivery of home and telenursing interventions is necessary to fulfill the needs and expectations of older adult clients.

It's an image only. I'm just talking to an image."

- They didn't change their appearance before using it. Participant S1 laughed while saying, "Oh gosh, I'm going to get up and put my make-up on before I talk to...[the DCP]."

At the end of the study, both female participants had a negative behavior use. They would not continue to use the VT if given the opportunity, nor would they recommend it to other people in their situation.

However, the male participants, both with technical backgrounds, had positive attitudes. This classification was characterized by their feelings about the VT, which included:

- It didn't invade their privacy. Participant S3 said, "See into my home? I thought that was good, because she [the DCP] sees the environment I'm living in. She actually sees me in my own surrounding."

- It made them more relaxed being able to stay at home. Being in their own environment made both men feel more relaxed during the VT sessions. Participant S3 said, "When you are at home, you are loosened up and you can talk." Participant S4 added that he preferred the VT sessions at home because "you don't have to fight for parking, especially down by...[the hospital's name]."

- Seeing the person felt more

personal. Seeing the person with whom they talked was for both male participants the foremost added value, as it provided a sense of connectedness. Participant S4 said that "you feel more connected this way [via the VT], you really do feel more connected when you see the person or the image of the person."

- It almost replaces face-to-face contact. Participant S4 said, "I think face to face is bit more intense, but

the VT was pretty close." Participant S3 mentioned, "I don't think there's any difference in the conversation... but the VT needs to be improved technically."

Both male participants had a positive behavior use, noting that they would recommend the VT for others in the same situation. Participant S3 said, "Oh yeah, I'd say, take the VT. I'd say, don't expect miracles with it, it's primitive, but it works.... I think it's an asset.... I think it's great."

### Technical Barriers

All participants were satisfied with the VT's sound quality except the oldest woman (S2), who expressed that the two-way communication was not yet fine-tuned. In contrast, all participants found the quality of the video image to be poor. Participants S1, S2, and S3 described the picture as jerky, unclear, and of poor color quality. The picture size was fine; however, participants S1, S3, and S4 believed that the video screen was similar to a photograph and were disappointed that they could not see detailed facial expressions or small movements. Participant S1 said, "I may as well have a picture in front of me." Participant S3 said, "Like if I said something funny, you could see the expression. Not all the expressions; I found it was hard to see a smile. A laugh you could see."

Participants S2, S3, and S4 said they would have preferred an image that was similar in quality to a television's. However, despite the image quality, the male participants emphasized that just being able to see the therapist was an improvement over a telephone. The technical barriers seemed to have influenced the ambivalent attitudes of the female subjects, as they could not see any personal benefits from using the VT.

### DISCUSSION

Users' attitudes have important implications about the acceptance and use of new technology. This study explored the attitudes of older adults with depression toward VTs. The two main findings that influence whether VTs should be used as a method of care delivery are clients' seeing the DCP, which gives a feeling of being connected and almost replaces face-to-face contact, and clients not seeing immediate health benefits for themselves.

The VT is an interactive two-way form of communication, with the aim of being fully present at a remote location from one's own physical location. The concept of presence (i.e., the subjective sensation of "being there") in a remote location has received much attention from the virtual reality community (IJsselsteijn, de Ridder, Freeman, & Avons, 2000). Two broad categories have been defined: physical presence (i.e., the sense of being physically located somewhere) and social presence (i.e., the feeling of being together with someone) (Freeman, 1999). A technical medium (e.g., telephone) can provide a certain amount of social presence or nearness with only a minimum of physical representation.

When ranking media preferences, people preferred "richness" (i.e., verbal discourse combined with nonverbal cues and communication context), consistently ranking face-to-face communication highest, followed by video, audio, and written memo (Rice, 1993). All participants in this study ranked face-to-face encounters highest, finding observable social behaviors and fa-

cial expressions important cues to social presence. Although the intention of information and communication technologies is to clearly reproduce all aspects of physical and social presence, eliciting a complete experience of presence is not within the means of the technology (Walker & Sheppard, 1997). However, despite perceptions of jerkiness, delays, and asynchrony while conversing via the VT, both male participants were pleased to see the person with whom they communicated. Contact via the VT was more personal, as it gave them a feeling of being connected.

These findings are supported by early studies using VTs for specific target groups, such as deaf people (Coninx & Josiassen, 1994) and people with moderate and profound mental retardation (Brodin, 1994). The VT provided closer human contact, especially for sign language communication. In this study, only participant S1, who had an ambivalent postattitude toward the VT, mentioned that the awkward interface stressed her. It distracted her attention from the conversation, as "it was just talking to an image." However, it is possible that the female participants did not derive any personal benefits from the VT because it provided poor images, not because they did not find the VT to be helpful. As a result, this may have interfered with the medium's ability to convey clear visual cues from the therapist and distracted the participants from the therapeutic process. There is evidence that patients and nurses prefer high-quality video images to communicate and deliver care, as they provide superior visualization (i.e., seeing a person's mimic state) (Wakefield, Holman, Ray, Morse, & Kienzle, 2004); however, existing commercial VTs are relatively unsuccessful in this area (Noll, 1992). Both female participants also stated that VTs do not replace face-to-face social contact because older adults who are depressed need to get up and out of the house. Bruce (2002) stated that lack of social contact is a significant psychosocial risk factor for late life de-

pressive disorders. However, although a VT conversation cannot be equated to optimal presence in a face-to-face conversation, it certainly has the potential to form an electronic substitute for face-to-face contact for different groups of homebound older adults (Arnaert & Delesie, 2001, 2007).

Both female participants mentioned that the VT is a valuable resource for "some people," despite not seeing immediate health benefits for themselves. This statement is supported by Whitten, Collins, and Mair (1998), who evaluated a tele-homecare program that provided nursing services to older adults at home. Also, Mann, Marchant, Tomita, Fraas, and Stanton (2001), who studied frail older adults' acceptance of home monitoring devices, indicated that the majority of participants had favorable responses to the devices. However, the participants viewed the devices as relevant and acceptable only for older adults who absolutely needed them, stating, "I think it would help many people." Frail older women at risk of falling who used a personal emergency response system expressed their experiences as "waiting to get it until I really need it" and "convincing myself that I might get it [the personal emergency response system] later" (Porter & Ganong, 2002). These findings suggest that older adults already using health care technologies did not identify themselves as having the need to use new technologies. However, Levy, Jack, Bradley, Morison, and Swanston (2003) established that older individuals welcome technology, when needed, that helps them stay at home as long as possible, even if it means losing some of their current freedom and control.

#### **IMPLICATIONS FOR NURSING PRACTICE AND RESEARCH**

The findings from this study have various implications for nursing practice. The advent of technology-supported care, such as VT care, offers new opportunities for the nursing pro-

fession. Nursing telepractice demands a new kind of nurse with specific skills, competencies, and qualifications, such as professional communication skills and sharpened cultural and ethnic awareness—information, rather than manual nursing skills. Nobody can foretell what specific skills and competencies the nurse of tomorrow will need to deliver remote care to older adults; however, it stands beyond doubt that the current formal education of nursing professionals will have to be revised to address the complex expectations and needs of the increasing number of older adults in society, along with the whole spectrum of wellness and illness. New nursing care models are necessary to promote, support, and educate about autonomy and self-care to sustain and enhance life and health as a universal right. It is up for debate to what extent the telenurse should operate as a case manager; however, VT nursing care must be seen as complementary to other kinds of care and should be part of a care network. The combined delivery of home and telenursing interventions is necessary to fulfill the needs and expectations of older adult clients.

This study provides insight into the attitudes of older adults, despite its small sample size. Future studies with a larger sample size should examine whether gender is still a factor in the participants' perceived need of the VT or whether the need is due to another factor, such as their expectations of a VT encounter, as opposed to their attitudes. Future investigations should also examine whether high-quality video images allow the nurse to better tailor care to the needs of the patients and whether a prior face-to-face working alliance with the nurse influences people's attitudes toward using the VT. Additional studies are needed exploring patients' attitudes, expectations, and perceptions of new technology in other locales and cultures. If we fail to consider these attitudes and instead design systems driven only by the features of current technology, we are at risk of adopting approaches that are

too closely associated with medical, and disempowered, models of older age (Fisk, 2003).

## CONCLUSION

VTs hold promising benefits for at-home care for older adults; however, attitudes can be a hindrance to the acceptance and use of new technologies. Because older adults are heavy consumers of health and social services, especially nursing care, this study represents a crucial step in understanding their attitudes, which may influence their use of telehomecare technologies in the future to deliver nursing services. Knowledge of their attitudes is also important for mutual understanding between technology designers and health scientists, which in turn has a direct effect on the innovation of user-friendly technologies produced for the delivery of telecare interventions better tailored for older adults.

## REFERENCES

- Arnaert, A., & Delesie, L. (2001). Telenursing for the elderly. The case for care via videotelephony. *Journal of Telemedicine and Telecare*, 7, 311-316.
- Arnaert, A., & Delesie, L. (2007). Effectiveness of video-telephone nursing care for the homebound elderly. *Canadian Journal of Nursing Research*, 39, 20-36.
- Arroll, B., Khin, N., & Kerse, N. (2003). Screening for depression in primary care with two verbally asked questions: Cross sectional study. *BMJ*, 327, 1144-1146.
- Baldwin, R.C., Chiu, E., Graham, N., & Katona, C.L.E. (2002). *Guidelines for depressive disorder of later life: Practising the evidence*. London, UK: Martin Dunitz.
- Beekman, A.T., Copeland, J.R., & Prince, M.J. (1999). Review of community prevalence of depression in later life. *British Journal of Psychiatry*, 174, 307-311.
- Bowles, K.H., & Dansky, K.H. (2002). Teaching self-management of diabetes via telehomecare. *Home Healthcare Nurse*, 20, 36-42.
- Brodin, J. (1994). Videotelephony for two persons with moderate mental retardation. *International Journal of Rehabilitation Research*, 17, 357-363.
- Brownsell, S.J., Bradley, D.A., Bragg, R., Catlin, P., & Carlier, J. (2000). Do community alarm users want telecare? *Journal of Telemedicine and Telecare*, 6, 199-204.
- Bruce, M.L. (2002). Psychosocial risk factors for depressive disorders in late life. *Biological Psychiatry*, 52, 175-184.
- Celler, B.G., Lovell, N.H., & Chan, D.K. (1999). The potential impact of home telecare on clinical practice. *The Medical Journal of Australia*, 171, 518-521.
- Chumbler, N.R., Mann, W.C., Wu, S., Schmid, A., & Kobb, R. (2004). The association of home-telehealth use and care coordination with improvement of functional and cognitive functioning in frail elderly men. *Telemedicine Journal and e-Health*, 10, 129-137.
- Collins, S.C., Bhatti, J.Z., Dexter, S.L., & Rabbitt, P.M. (1992). Elderly people in a new world: Attitudes towards communication technologies. In H. Bouma & J.A.M. Graafmans (Eds.), *Gerontechnology*. Amsterdam: IOS Press.
- Collins, S.C., & Dexter, S.L. (1990, April). *The interface between elderly people and new technology*. Paper presented at the annual conference of the British Psychological Society, Swansea, UK.
- Coninx, F., & Josiassen, E. (1994). Videophone broadens outlook for deaf people. In L.M. Pereira & J.I. Lindström (Eds.), *Videotelephony for disabled and elderly people. COST 219. Future telecommunications and teleinformatics facilities for disabled people and elderly* (pp. 5-8). Brussels, Belgium: Commission of the European Communities.
- Czaja, S.J. (2005). The impact of aging on access to technology. *ACM SIGACCESS Accessibility and Computing*, 83, 7-11.
- Day, S.X., & Schneider, P.L. (2002). Psychotherapy using distance technology: A comparison of face-to-face, video, and audio treatment. *Journal of Counseling Psychology*, 49, 499-503.
- Demiris, G., Rantz, M.J., Aud, M.A., Marek, K.D., Tyrer, H.W., Skubic, M., et al. (2004). Older adults' attitudes towards and perceptions of 'smart home' technologies: A pilot study. *Medical Informatics*, 29, 87-94.
- Demiris, G., Speedie, S., & Finkselstein, S. (2001). Change of patients' perceptions of TeleHomeCare. *Telemedicine Journal and e-Health*, 7, 241-248.
- Eagly, A.H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Ellis, C. (1996). *Older adults and learning technologies: Literature review*. Regina, Saskatchewan, Canada: Seniors' Education Centre, University of Regina.
- Fisk, M.J. (2003). *Social alarms to telecare: Older people's services in transition*. Portland, OR: International Specialized Book Services.
- Freeman, J. (1999). *Subjective and objective approaches to the assessment of presence*. Unpublished doctoral dissertation, University of Essex, Colchester, UK.
- Gilly, M.C., & Zeithaml, V.A. (1985). The elderly consumer and adoption of technologies. *Journal of Consumer Research*, 12, 353-357.
- Harris, Y. (2007). Depression as a risk factor for nursing home admission among older individuals. *Journal of the American Medical Directors Association*, 8, 14-20.
- Harris, Y., & Cooper, J.K. (2006). Depressive symptoms in older people predict nursing home admission. *Journal of the American Geriatrics Society*, 54, 593-597.
- Hegel, M.T., Imming, J., Cyr-Provost, M., Noel, P.H., Arean, P.A., & Unutzer, J. (2002). Role of behavioral health professionals in a collaborative stepped care treatment model for depression in primary care: Project IMPACT. *Families, Systems & Health*, 20, 265-277.
- Hunkeler, E.M., Meresman, J.F., Hargreaves, W.A., Fireman, B., Berman, W.H., Kirsch, A.J., et al. (2000). Efficacy of nurse telehealth care and peer support in augmenting treatment of depression in primary care. *Archives of Family Medicine*, 9, 700-708.
- Ijsselstein, W.A., de Ridder, H., Freeman, J., & Avons, S.E. (2000). Presence: Concept, determinants, and measurement. *Proceedings of the SPIE*, 3959, 520-529.
- Jay, G.M., & Willis, S.L. (1992). Influence of direct computer experience on older adults' attitudes toward computers. *Journal of Gerontology*, 47, P250-P257.
- Jessome, J., & Parks, C. (2001). *Everyday technology and older adults: Friends or foes? Final report*. Halifax, Nova Scotia, Canada: Nova Scotia Centre on Aging, Mount Saint Vincent University.
- Jessome, J., Parks, C., & MacLellan, M. (2001). Everything technology and older adults. In P. Raymaker & N. Garrard (Eds.), *Seniors and technology* (pp. 6-12). Ottawa, Ontario, Canada: National Advisory Council of Aging.
- Johnson, P., Andrews, D.C., Wells, S., de Lusignan, S., Robinson, J., & Vandenburg, M. (2001). The use of new continuous wireless cardiorespiratory telemonitoring system by elderly patients at home. *Journal of Telemedicine and Telecare*, 7(Suppl. 1), 76-77.
- Kroenke, K., Spitzer, R.L., & Williams, J.B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606-613.
- Lehoux, P. (2004). Patients' perspectives on high-tech home care: A qualitative inquiry into the user-friendliness of four technologies. *BMC Health Services Research*, 4, 28.
- Levy, S., Jack, N., Bradley, D., Morison, M., & Swanston, M. (2003). Perspectives on telecare: The client view. *Journal of Telemedicine and Telecare*, 9, 156-160.
- Lipartito, K. (2003). Picturephone and the information age: The social meaning of failure. *Technology and Culture*, 44, 50-81.
- Mann, W.C., Marchant, T., Tomita, M., Fraas, L., & Stanton, K. (2001). Elder acceptance of health monitoring devices in the home. *Care Management Journals*, 3, 91-98.
- McCusker, J., Cole, G., Cappeliez, P., Yaffe, M., Voyer, P., Arnaert, A., et al. (2004). [Project DIRECT: Depression Interven-



- tion via Referral, Education, and Collaborative Treatment.] Unpublished raw data.
- Menon, A., Kondapavalru, P., Krishna, P., Chrismer, J.B., Raskin, A., Hebel, J.R., et al. (2001). Evaluation of a portable low cost videophone system in the assessment of depressive symptoms and cognitive function in elderly medically ill veterans. *Journal of Nervous & Mental Disease, 189*, 399-401.
- Nelson, E.L., Barnard, M., & Cain, S. (2003). Treating childhood depression over videoconferencing. *Telemedicine Journal and e-Health, 9*, 49-55.
- Noll, M. (1992). Anatomy of a failure: Picturephone revisited. *Telecommunications Policy, 16*, 307-316.
- Paul, C., Ayis, S., & Ebrahim, S. (2006). Psychological distress, loneliness and disability in old age. *Psychology, Health & Medicine, 11*, 221-232.
- Perälä, J., & Lounela, L. (1991). Videotelephone-based support services for elderly and mobility disabled people. In S. von Tetzchner (Ed.), *Issues in telecommunication and disability* (pp. 379-385). Luxembourg, Luxembourg: Commission of the European Communities.
- Pereira, L.M., Matos, M., Purificação, H., & von Tetzchner, S. (1991). Use of videotelephones for intervention and independent living. In S. von Tetzchner (Ed.), *Issues in telecommunication and disability* (pp. 350-359). Luxembourg, Luxembourg: Commission of the European Communities.
- Porter, E.J., & Ganong, L.H. (2002). Considering the use of a personal emergency response system: An experience of frail, older women. *Care Management Journals, 3*, 192-198.
- Regan, D.T., & Fazio, R. (1977). On the consistency between attitudes and behaviour: Look to the method of attitude formation. *Journal of Experimental Social Psychology, 13*, 28-45.
- Rice, R.E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organizational media. *Human Communication Research, 19*, 451-484.
- Savenstedt, S., Zingmark, K., & Sandman, P.O. (2003). Video-phone communication with cognitively impaired elderly patients. *Journal of Telemedicine and Telecare, 9*(Suppl. 2), S52-S54.
- Schackel, B. (1986). Ergonomics in design for usability. In M.D. Harrison & A.F. Monk (Eds.), *People and computers: Designing for usability. Proceedings of the second conference of the BCS HCI Specialist Group*. Cambridge, UK: Cambridge University Press.
- Spitzer, R.L., Kroenke, K., & Williams, J.B. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ Primary Care Study. *The Journal of the American Medical Association, 282*, 1737-1744.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage.
- Unutzer, J., Katon, W., Callahan, C.M., Williams, J.W., Hunkeler, E., Harpole, L., et al. (2002). Collaborative care management of late-life depression in the primary care setting. A randomized controlled trial. *The Journal of the American Medical Association, 288*, 2836-2845.
- Wakefield, B.J., Holman, J.E., Ray, A., Morse, J., & Kienzle, M.G. (2004). Nurse and patient communication via low- and high-bandwidth home telecare systems. *Journal of Telemedicine and Telecare, 10*, 156-159.
- Walker, G.R., & Sheppard, P.J. (1997). Telepresence: The future of telephony. *BT Technology Journal, 15*, 11-18.
- Whitten, P., Collins, B., & Mair, F. (1998). Nurse and patient reactions to a developmental home telecare system. *Journal of Telemedicine and Telecare, 4*, 152-160.
- Zimmer, Z., & Chappell, N.L. (1999). Receptivity to new technology among older adults. *Disability and Rehabilitation, 21*, 222-230.