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### Advantages and Challenges to using Telehealth Medicine

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**Method:** Reviews of literature using nursing data base (ProQuest-Health and Medical Complete) with the term telehealth in nursing was used. Limits used to narrow the search were full text, peer reviewed, English language, human only and dates between 2011 and 2014.

**Results:** The literature search located 34 articles from ProQuest. A total of 7 articles that support advantages or disadvantages to using telehealth were used.

**Conclusion:** The articles had mixed result for advantages and challenges at the healthcare provider level and the patient level. Issues with weak signals, misinterpreted data, and patient reading errors were evaluated for safety issues. Several clients and caretakers failed to report results during studies hindering outcomes. Client satisfaction and quality of life were addressed to evaluate the client and family views of telehealth medicine.

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## I. INTRODUCTION

With populations aging world-wide and age-related chronic diseases increasing; there is an increased need for healthcare access (Wade, Shaw, and Cartwright, 2012). Health informatics has been growing in the healthcare industry since the 1950 and 1960's (Stenlund and Mines, 2012). Information can be gathered, stored, retrieved and shared by multiple disciplines as a way to improve quality and safety in patient care delivery. This article discusses factors that enhance or inhibit safe patient care delivery using telehealth technology. Healthcare providers will be evaluated to identify benefits and limitations to using information technology as a way to collaborate with other disciplines or clients. Ways to improve information delivery and clear up misunderstandings will be addressed to offer information clarity for both healthcare provider and client recipients.

As healthcare service needs are increasing, information technology is also increasing to meet the demand of global populations. Welfare technology (WT) was launched to improve healthcare access, reduce

financial burden, and conduct research (Hoffman, 2012). Ethical challenges concerning tracking, disease monitoring, surveillance and privacy will be discussed to identify risk/benefit outcomes using telehealth technology.

The purpose of this research is to evaluate data that supports advantages and challenges to using telehealth medicine. This information can be used by healthcare organizations to implement programs or change current practices in an effort to offer better healthcare delivery for global populations. Views of using technology information by healthcare providers and clients can be used to improve education needs or improve system design.

## II. ADVANTAGES TO USING INFORMATION TECHNOLOGY

Telehealth medicine is growing constantly to offer healthcare world-wide. It is an avenue to assess, diagnose, plan, implement and evaluate data over time or distances. Education and communication can be valuable to clients without access to healthcare. Research can be obtained or shared to improve evidence based knowledge.

Hoffman (2012) conducted a study with 281 out of 1976 articles to evaluate advantages and ethical challenges to using information technology. His research revealed several positive results. Many identified that mobility technology can increase flexibility, agility, and movability. Internet based psychotherapy and telemedicine for home services resulted in reduced mortality, better medication compliance, and improved safety from falls or security issues. His research also identified that elderly clients welcome new technology and surveillance as it reduces fear and insecurities.

Having the remote capability to offer specialty care and access to rapid assessment and treatments can be an answer to a shortage of experts in underserved locations. Technology may benefit clients with sensory impairment, social isolation, and depression. The speed of healing processes using hospital services at home may be more effective and will promote dignity (Bonanno, Bramanti, Pirrotta, Spadero Bramanti and Lanzafame, 2013).

Stenlund and Mines (2012) suggested that videoconferencing along with telephone, facsimile, and e-mail is a great way to communicate. Video-

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conferencing allows communication over long distances while viewing and hearing each other. Using this technique addresses issues such as geographic barriers, weather concerns, access to healthcare providers, reduced stress, access to education, monitoring and travel time.

Watanabe, Fairchild, Pituskin, Borgersen, Hanson and Fassbender (2012) conducted a study using forty-four initial consultation clients and 28 follow-up visit clients using video conferencing. The result showed that most of the clients or caretakers expressed a high degree of satisfaction with various aspects of the virtual clinic. Only 6.8 percent indicated discomfort with telehealth equipment or format. Nineteen of 44 percent of physicians returned surveys and all of them agreed that their patients received an easy to use and valuable service that would be difficult to access by other means. Videoconferencing can be beneficial for oncology consultations, home hospice nursing visits, team meetings, and education for clients or healthcare providers.

Vinson, McCallum, Thornlow and Champagne (2011) were responsible for designing a pilot program for reorganizing their ambulatory clinic under hospital guidelines to enhance reimbursements. Strategies that were implemented to improve outcomes and reduce costs were telehealth nursing, telephone triage, and telephone nursing. A total of 136 of 344 patients consented to participate in this pilot study. The results revealed that 81.2 percent of the clients rated telehealth medicine as being high or very high in value and 88.1 percent of the clients stated that their needs were met. Only 1.1 percent of the calls were urgent. Hospital and clinic visits drastically decreased for situations such as prescription refills, test results, advice about medication, self-care questions, and after hour visits. Feedback from 75 percent of the providers revealed that only 55.6 percent of the providers refer their patients to telehealth however; those providers rate the service as high level of satisfaction. The cost of this service was made up by adjusting the clinic staffing cost. They used existing phone jacks, cable wires, and office space to reduce overall expenses for setting up the service. Multiple disciplines were set up with individual programs that were linked to one network so that information could be shared simultaneously.

### III. DISADVANTAGES TO USING INFORMATION TECHNOLOGY

Although there are many advantages to using information technology, there are disadvantages and ethical issues as well. Watanabe, Fairchild, Pituskin, Borgersen, Hanson and Fassbender (2012) found that rural family physicians were not aware of the virtual clinic despite advertising over the fax, telephone, internet and media. Recommendations were delayed due to lack of

physician contact or unavailability. Appointments took more time to enter into the telehealth system than hand written. Several clients had to travel long distances to visit the telehealth site for pain management. This study lacked a control group and had a small number of participants. There was no follow-up data to compare. There was not a cost analysis for set-up, staff training, or impact on the healthcare system.

Wade, Shaw, and Cartwright (2012) conducted a study to identify reasons for failed readings of telehealth monitoring equipment on elderly people with chronic diseases. They identified that of 255 people, 112 people did not meet the criteria for participation and 50 were already using some form of telehealth system. Thirty-two clients lacked capacity and did not have care assistance to help them with their readings on a regular basis. The clients were given questions to answer daily. All caretakers were trained and observed in the use of the telehealth equipment. Of 43 participants, (56%) had caretakers, (39%) had orthopedic issues, (16%) had mobility impairment or falls, (10%) had cardiovascular issues, (10%) had neurology issues, (5%) had respiratory issues, (5%) had malignancy issues, (4%) had renal issues, (3%) had infection, and (8%) were other issues.

Of the 43 clients in this study, (100%) were required to take daily heart rate readings, (98%) were required to take daily blood pressures, (46%) required daily weight readings, and (42) required daily pulse oximetry readings. Results found that there was an overall (13%) failure rate. Weight failed (17%), blood pressure failed (15%), heart rate failed (14%), pulse oximetry failed (15%), and daily questions failed (6%). The finding suggested that inaccurate reading were about even with or without caretakers. The study did not elaborate whether the caretakers were family, friends, hired nurses, or companions. It also did not mention the age of the caretakers. Readings were recorded as both reported, but wrong and unreported. Caretakers did not document the reason for reading failure. Caretakers were left to their clinical judgement whether a client needed a follow-up appointment.

This study suggests that reading errors can have harsh negative consequences. It is dangerous because it provides false information to medical staff. Non-reporting withholds vital information necessary for practitioners to form a plan of care.

Ethical question that needs to be answered before implementing a telehealth program: Who will benefit? Is it more useful for the client, healthcare providers or the stakeholders? What is the end point? Will it reduce mortality or increase quality of life? Will it be cost effective? Who will be installing and monitoring the devices? How will consent be obtained? If these questions can be answered through studies, client/family satisfaction scores, physician surveys, etc.;

then a pilot program is ready to be implemented (Hoffman, 2012).

Hoffman (2012) suggests that implementing technology may be age discriminating by enhancing differences and inequalities. It is not fair to expect family members to learn new technology. This added burden may alter family ties. Monitoring and tracking devices may infringe on a person's right to privacy, autonomy, surveillances, and confidentiality.

#### IV. MAKING TECHNOLOGY MORE USER FRIENDLY

Hoffman (2012) suggests that subjective barriers can be overcome by installing devices such as labeling, mirror doors without knobs, coded door openers, etc. to enhance a person's right to dignity and privacy. Risk vs. benefit in relation to surveillance and privacy may be complicated. Surveillance of an elderly person with cognitive decline, a pacemaker/defibrillator, or diabetes mellitus may need surveillance for safety reasons.

Karim, Zulkifley, Mustafa, Sagap and Latar (2013) suggested that the natural presence of gesture, interaction, instructions, face expression, and voice helps explain meaning of a speech however; long distance communication loses clarity and signal strength which leads to misunderstandings and misinterpretations. Telepointer communication can be used to convey human gesture by pointer motion. Telepointers can be classified by low level such as a laser pointer or high level such as hand gestures, sketching, drawing or overlaying hands.

Telepointer technology allows the sender to point at exact areas being represented while simultaneously letting the observers see the same views. Telepointer provides coordinate information, creates a presence of self, and gains audience attention. This technology can be used for education, consultation, surgery, and many other needs.

Wade, Shaw, and Cartwright (2012) suggests that monitoring equipment for home use should be as easy as following a few simple prompts or pressing a button. Instructions to the care givers explaining the importance of reporting monitor results is necessary. Elderly clients can decompensate quickly without prompt attention by medically trained staff.

#### V. DISCUSSION

All of the articles showed evidence of advantages and disadvantages to using telehealth technology. The advantages clearly outweigh the challenges and ethical dilemmas. A majority of client's, caretakers, and physicians expressed satisfaction with telehealth technology. More needs to be studied about the ease of monitoring device use to improve reading

errors. Caretakers need more instruction about the importance of reporting monitor results.

Ethical issues need to be studied further to identify if elderly people with cognitive decline have the right to refuse telehealth monitoring equipment. Assessment of safety and security needs to be evaluated for people refusing care. Are there ways to keep an elderly person safe and secure while maintaining their right of dignity and privacy? Is surveillance and tracking intruding on a person's privacy if used as a safety measure?

Telehealth technology should be easy to use for the client and the provider. Before implementing new telehealth technology, questions need to be answered such as: Who will benefit? Is it more useful for the client, healthcare providers or the stakeholders? What is the end point? Will it reduce mortality or increase quality of life? Will it be cost effective? Who will be installing and monitoring the devices? How will consent be obtained?

Telepointer technology can help give clarity to a presentation, instructions, explanation, etc. Using low to high level telepointer technology can offer human gesture from pointer motion. Using the telepointer can resolve misunderstandings or misinterpretations.

This analysis is intended to support advantages and disadvantages to using telehealth medicine. This information can be used as guidance to make evidence based decisions before implementing a telehealth program.

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