

User Perceptions of the Telemedicine Programme in Nursing Homes

The Singapore Perspective

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Abstract: Geriatric care is a holistic approach to caring for older persons with complex health problems, so as to meet their long term care needs and maintain their independence for as long as possible. Due to a scarcity of geriatricians, Telegeriatrics was piloted in December 2010 by an acute hospital in Singapore to improve access to geriatric specialists for nursing homes. This preliminary study explores the perspectives of users from the NHs and the acute hospital on two aspects of Telegeriatrics – the telemedicine consultation and the nurse training programme. Seven focus group discussions and two semi-structured moderate interviews were conducted with a total of 24 participants. Thematic content analysis was applied to identify important themes and new themes that emerged during the coding process. The most commonly recognised benefits were increased access to specialist care, reduced need for hospitalizations, improved quality of care, and enhanced nursing skills and knowledge. However, the greatest barriers as perceived by the users were the lack of personal touch, technical issues, and medico-legal issues. The users expressed general acceptance of Telegeriatrics in providing geriatric care. They were aware of its limitations and challenges, but also recognized it as a promising way of providing consultation and strengthening nursing skills.

1 INTRODUCTION

Telemedicine, a combination of telecommunications technology and medicine, is seen as a solution to delivering healthcare services when distance becomes a crucial element of consideration (Armstrong and Haston, 1997; Bashshur et al., 2000; Clark et al., 2007). In some countries, the ageing population has resulted in an increase in the development of telemedicine for older people (Goins et al., 2001; van den Berg et al., 2012). Telemedicine can also bridge knowledge and skills gaps in nursing home (NH) care by introducing continuous nurse training and education. As a result of Singapore's rapidly ageing population and severe bed crunch (Cheah and Heng, 2001; Ong et al., 2014), 'remote' medicine could be the key to improving outcomes for the elderly without requiring emergency department (ED) use (Shah et al., 2007; Trief et al. 2007). Telemedicine consultations that provide timely specialist access to the NHs can be instrumental in detecting and

treating symptoms early, thereby enabling NH residents to be managed in the NHs and preventing unnecessary transfers to the acute hospitals (Ellis et al., 2001; McLean et al., 2012; Grabowski and O'Malley, 2014). Furthermore, telemedicine provides NH nurses with additional training and educational opportunities (Janet et al., 2011). Increased access to knowledge, enhanced understanding of medical conditions and improved decision making capacity can improve the quality of care and decrease transfers to the acute hospital.

Telegeriatrics is an on-going programme that was started in December 2010 by an acute hospital in Singapore. It is targeted at providing geriatric specialist services for the elderly in three partnering NHs. Prior to the programme, the NHs had limited access to specialist care. There was heavy reliance on nursing care and physical visits by general practitioners. Limited by an inadequate supply of geriatricians, video-conferencing between the patient and the geriatrician enables the provision of timely and accessible care, while reducing

unnecessary travel and associated costs.

One main aspect of the programme was for NH residents to receive real-time telemedicine consultation with a geriatrician. A high-resolution camera and high-definition video monitor were installed in the acute hospital and the NHs. The mobile videoconferencing unit ensures that telemedicine consultations can be held at either the consultation room or the resident's room.

Before consultation, the nurse refers residents requiring specialist care for consultation. In a typical telemedicine consultation, a nurse from the NH describes the presenting symptom(s) or problem(s), while the geriatrician identifies the nature of the problem and prescribes the appropriate treatment. The consultation is documented in a form. This form is used to document elements of the resident's visit such as the name of consulting doctor, any assessments completed by the nurse and any information received from other healthcare facilities. After consultation, the form is emailed to the NH for the nurses to follow up with the management plan. Both the nurse and geriatrician play important roles in representing the effectiveness of telemedicine to provide care as this could influence user perceptions to a certain extent.

Another arm of the programme was continuous education and training for the NH nurses, who are the main carers of NH residents. Before telemedicine consultations can be facilitated by the geriatrician and the nurse, selected staff and enrolled nurses from the NHs need to undergo training. The aim of the 9-month Telegeriatics Nurse Training Course (TNTC) is to equip these nurses with a specific set of knowledge and skills targeted at managing NH residents. The nurses were also taught how to perform simple assessments and physical examinations to enable them to assist the geriatricians during telemedicine consultations. In order to ensure coordinated and integrated care, multi-disciplinary meetings and mortality audits were also held via videoconferencing.

The acute hospital's administrators were the indirect users of Telegeriatics as they provided the on-going support for the programme's operations. In particular, they manage matters such as administrative support, partnering NHs' feedback, and process improvements.

In several studies, effectiveness of telemedicine in providing care has been explored using user satisfaction as the main outcome, and these users have reported high levels of acceptability and willingness to adopt this technology into their practices (Linassi and Li, 2005; Mair and Whitten,

2000; Yip et al., 2003). However, to date, emphasis is placed solely on how useful the telemedicine consultation is, over general satisfaction with the intervention that is required for knowledge development and quality improvement in the area of telemedicine (Demiris et al., 2004; Whitten et al., 2005). In addition, user readiness in integrating telemedicine into both clinical practice and continuous nursing education has not been assessed in a Singapore context.

This study was designed with the aim of examining user perceptions and experience of the telemedicine system as well as the influence of education on the NH nurses in Singapore. By reporting on the users' experiences of Telegeriatics, it is hoped that the hospital's administrators can develop targeted improvement measures to address gaps identified in the Telegeriatics' training curriculum, processes and resources.

2 METHODS

2.1 Ethics Approval

Ethics approval was obtained from the National Healthcare Group Domain Specific Review Board (DSRB).

2.2 Setting and Recruitment

Three existing NH partners of the acute hospital's Telegeriatics programme were recruited for this study.

An interview guide was developed to elicit responses on the impact of Telegeriatics on the quality of resident care, cost-effectiveness, user's ability to express clearly in a virtual visit, ease of equipment use, challenges, sense of intimacy, and potential for long-term use.

Staff who have used the videoconferencing system for consultations, multidisciplinary meetings and mortality audits, were recruited. All the nurses who were included in this study had completed TNTC.

To grasp a more holistic, integrated view of the Telegeriatics experience, both direct and indirect users were recruited for this study:

- i. Nurses of each NH*
- ii. Nurse managers of each NH*
- iii. Geriatricians of the acute hospital*
- iv. Administrators of the acute hospital*

The initial plan for this study was to conduct

only focus group discussions (FGDs) with the users. However, during the plan’s execution, we conducted two semi-structured interviews in addition to the FGDs. For one of the NHs, only one nurse manager was involved in Telegeriatrics and hence was scheduled for a semi-structured interview. For one NH, a nurse who was not available on the day of the FGD was scheduled for a semi-structured interview.

The FGDs with the geriatricians and the hospital’s administrators were held at the acute hospital while those with the nursing staff and nurse managers were conducted at the three respective NHs.

2.3 Procedures

Seven FGDs and two semi-structured interviews were conducted between February 2014 and July 2014.

Table 1: Composition of FGDs and semi-structured interviews.

Composition	Participants, N = 24 n
FGDs	
NH1’s staff and enrolled nurses	5
NH2’s staff and enrolled nurses	3
NH3’s staff nurses	5
NH1’s nurse managers	2
NH2’s nurse managers	2
Hospital’s geriatricians	2
Hospital’s administrators	3
Semi-structured interviews	
NH2’s enrolled nurse	1
NH3’s nurse manager	1

Each FGD and semi-structured interview lasted approximately 1 hour and 30 minutes respectively. The FGDs and the individual semi-structured interviews were conducted face-to-face by the first author. Prior to the FGDs and semi-structured interviews, the moderator briefed the participants on the purpose of the study, the expected duration of the session, and their responsibility as a participant in the session. They were also given sufficient time to ask questions, and signed a standardized informed consent form specifying the benefits and risks of the study. An interview guide which consisted of structured, open-ended questions was used to encourage the participants to express their unique perspectives of the programme. Field notes were taken during the sessions which allowed for triangulation of data (Burns and Grove, 2001).

2.4 Data Analysis

Responses from all the FGDs and semi-structured interviews were audio recorded and were also documented in detailed, word-for-word transcripts by the first author. This study used an explorative and descriptive design, in which qualitative content analysis (Hsieh and Shannon, 2005) was used to search for contexts, meanings, interpretations, and consequences.

Both inductive and deductive approaches were employed in the process of the categorization. The main categories were formed mainly based on the concepts derived from literature reviews (Dansky et al., 1999; Greater Southern Area Health Service, 2009).

The Miles and Huberman (1994) framework was used for management of the data. The transcripts were first read in detail to obtain a general view of the main categories. They were then reviewed and coded where supplementary notes on the ideas that emerged were made, to form the main categories. The main categories were presented in a table in Microsoft Excel to allow for further thematic description, and combination of main categories and sub-categories to emerge as themes and sub-themes. Supporting comments explain these themes in the participants’ own words. Identification of links and patterns between themes and sub-themes resulted.

3 RESULTS

The study group primarily comprised of females, who are mainly nurses (Table 2). 79% of the users were from the NHs, and hence the NH users’ perceptions are more representative of the interview responses. All participants had no prior experience with facilitating consultations via the

Table 2: Characteristics of focus group and semi-structured interviews participants.

Characteristics	Participants, N = 24 n (%)
Gender	
Female	17 (71)
Designation	
Administrator	3 (13)
Geriatrician	2 (8)
Nurse Manager	5 (21)
Senior Staff Nurse	1 (4)
Staff Nurse	9 (38)
Enrolled Nurse	4 (17)

video-conferencing system.

The five themes that emerged from the FGDs and semi-structured interviews were: (1) Accessibility; (2) Continuity of care; (3) Impact on nursing; (4) Technology; and (5) Ethics.

Table 3: Themes and sub-themes that emerged from FGDs and semi-structured interviews.

Themes	Sub Themes
Accessibility	(i) Increased access to specialist care (ii) Reduced waiting and travelling time
Continuity of care	(i) Reduced need for hospital admissions (ii) Dying & quality of death (iii) Joint decision making (iv) Inadequacies of NHs
Impact on nursing	(i) Positive effects on nurses (ii) Increased expectations (iii) Negative impacts
Technology	(i) Receptiveness of residents' (ii) Technical issues (iii) Decreased social presence (iv) Personal touch
Ethics	(i) Distrust in nurses (ii) Medico-legal issues (iii) Risk of confidentiality breach

3.1 Accessibility

NH residents could reap the benefits from prompt specialist attention, especially from ad-hoc consultations. This allowed for the prevention and treatment of complications so to prevent emergencies and hospitalizations.

“Through telemedicine, we can start treatment straight away so [that] patients can get better... Secondly, if residents are not well, then doctor will advise sending [residents] to hospital straight away, so you administer treatment early... They also stay in hospital [for a] shorter time.” (Nurse Manager)

The frequency of visits to the specialist clinics

was also reduced, as residents may not require additional specialist medical advice after telemedicine consultations. Other cited benefits were related to the reduction of costs including travel expenses for specialists and hospital transfers; and reduction in stress levels associated with transferring of residents.

“Reduces doctor’s travelling. Reduces the need to travel to a site, and the time involved is money.” (Geriatrician)

3.2 Continuity of Care

Increased specialist access has resulted in managing residents on-site, therefore avoiding a trip to the ED and/or a hospital admission.

“In [the] case they (the residents) are sick, we just can call the hospital for a tele-consultation... Our admission rates are lesser now...” (Staff Nurse)

The use of telemedicine presents an opportunity for the residents to achieve better quality of death, as end-of-life care preferences were discussed during telemedicine consultations. The NH nurses could then tailor their care according to these preferences.

“They (the residents) want to die in a place where they are familiar with, with the familiar surroundings and people around them.” (Nurse Manager)

Coordination of care through multidisciplinary meetings to address complex problems assured consistency in delivering holistic, better quality clinical care.

“I think it’s very beneficial, because how can you get all the professionals together just for one case? That will be time-consuming. I think sometimes we have to maximize the use of technology.” (Nurse Manager)

A limiting factor of continuing care in the NH was the inadequacy of resources in the NHs. This resulted in referrals to ED, even though the geriatrician and the nurse could coordinate resident care and manage conditions in the NH.

“Nursing homes have no access to equipment like [one with] diagnostic capability, for example, so to manage the patient better... Consultation alone is only one aspect.” (Nurse Manager)

3.3 Impact on Nursing

Nurses felt a deep sense of commitment and dedication in caring for their residents. They were proud of their expanded role and appreciated that the TNTC has equipped them with confidence,

knowledge, and skills. After the course, they could detect signs and symptoms early, as well as perform physical examinations. The course has also helped them to better identify and escalate changes in residents' medical conditions to the nurse manager or doctor.

"It [the TNTC] makes us, all of us, more confident, more systematic in doing assessment and delivering system of care toward the patient." **(Staff Nurse)**

A number of users felt that with Telegeriatrics in place, nurses must play a more active role. For example, nurses must be able to distinguish medical conditions that require specialist care from the others, present and document accurately residents' case history, and manage more diverse conditions in the NHs.

"The tool (consultation via videoconferencing to provide care) actually forces the nurses to step up because you are trying to limit the amount of doctoring that is occurring in the nursing homes."

(Hospital's Administrator)

Language differences were one of the barriers to effective communication during telemedicine, affecting the quality of consultations. Language barriers were significant, particularly between foreign nurses and the local doctors.

"I still have some problems hearing the nurses properly, especially the foreign ones..."

(Geriatrician)

Another negative impact of telemedicine was the lack of comfort and unfamiliarity with technology when the telemedicine consultations were first implemented in the NHs.

"They (the nurses) were not comfortable, having to tell the case [is] like talking to a wall." **(Nurse Manager)**

However, over time, the nurse managers observed an improvement in the nurses' confidence and competency in communication skills, and ability to facilitate consultations independently.

"They are more confident and their flair for the case presentation is much better than initially. Now they even own the whole consultation without my involvement most of the time." **(Nurse Manager)**

3.4 Technology

The nurses expressed concerns about the residents' ability to readily adopt telemedicine as a form of technology-enabled care. A nurse described how the residents exhibited initial unfamiliarity during consultations.

"Sometimes we need to repeat [our

explanations] to the residents, because residents didn't know where to focus on. They didn't know about telemedicine, but they knew the doctor is with them... Sometimes they didn't know that he (the doctor) is talking to them." **(Nurse Manager)**

However, the residents were observed to adapt well to the new technology. They were receptive towards the experience and felt assured by the geriatrician's words. A nurse manager described the residents' experience as mainly positive:

"They actually acknowledge [the doctors] and they are quite happy and will wave at the doctors and they follow the instructions from the doctors."

(Nurse Manager)

The most frequently identified challenge was the, sometimes, unfriendly medium of technology. Delays or problems with transmissions, and visual and audio quality have reportedly hindered flow of information delivery, lengthened consultation duration and made the experience a dissatisfying one.

"The reception is so poor that we have to stop because it doesn't help us at all. If we are going to have this type of reception, I say, it doesn't serve any purpose. We can't hear what is going on, we can't see [too], so it's not useful for us." **(Nurse Manager)**

Decreased social presence was also another barrier to using telemedicine. Social presence is the social degree of person-to-person awareness, which occurs in a mediated environment (Tachakra and Rajani, 2002). A common example quoted by the users was the tendency to assume that the user at the remote end could not hear them and in response, they spoke louder over the system.

"I have a habit of speaking very loudly during telemedicine. Actually they (the hospital's administrators) say I don't have to talk so loudly but then naturally, I tend to speak louder than usual." **(Geriatrician)**

The geriatrician's physical presence was perceived by some as primacy as it serves as a form of emotional support for the residents. Digital interaction was reported to be "different" from a physical consultation.

"There's this article about this ritual of examining the patient; it means a lot to patients. It's not necessary to listen to the lungs; you still have to put the stethoscope there." **(Geriatrician)**

However, they expressed understanding that although telemedicine can never replace personal touch, a key solution will be continued medical oversight. Physical visit as a follow-up to a telemedicine consultation was suggested to provide

the right balance, asserting that the traditional method of face-to-face consultation should never be relinquished.

“You still need physical visits interspersed with the tele-consultation. This is to supplement the completeness, where you have one physical examination of this patient regularly...”
(Geriatrician)

3.5 Ethics

The main ethical concern is related to trust issues between doctors and the nurses during the telemedicine consultations. Lack of trust by doctors in the nurse’s ability to perform accurate physical examinations exists and this could possibly compromise the quality of resident care.

“There will come a time where we are so good that we don’t have a clinical educator here, so the doctor there will have to really take us seriously, and whether he is going to trust that info given to him, really that decision he has to decide...”
(Nurse Manager)

The other potential risk associated with technology-enabled care includes potential liabilities of the health professional. With medical tele-diagnosis, medical liability is the main risk. Insecurities were expressed regarding this grey area:

“For some conditions, it’s just not safe enough to just have telemedicine. You need to see the patient and examine the patient...”
(Geriatrician)

4 DISCUSSION

There was a general positive response to this new way of accessing geriatric care. According to the users, the programme reduced the need for unnecessary travel and provided timely diagnosis and treatment. The users identified with the benefits of using telemedicine to manage residents and improve adherence to care plans and clinical outcomes, thereby avoiding hospital transfers.

The nurse managers and nurses felt the benefits brought about by TNTC. TNTC taught the nurses to improve on their existing skill set and to apply it not only in telemedicine consultations, but also in their routine nursing practices. The nurse managers particularly expressed that the education aspect of the programme, including multidisciplinary meetings, was useful, as care for the residents was coordinated among health care professionals. According to a study by Gagnon et al. (2010), telemedicine applications can facilitate

communication among health care professionals, and lead to a more coordinated and effective management. Also, mortality audits have helped the nurse managers and nurses recognize factors that contribute to the immediate and underlying cause of death. They could address suboptimal care practices, and take steps to prevent such factors that could lead to similar deaths in the future. Such audits if conducted consistently have the potential to decrease morbidity and mortality, leading to standardized and improved care (Pattinson et al., 2009). Telegeriatrics has empowered the NHs to conduct after-death reviews, which have recently been introduced by Ministry of Health as a criterion for the enhanced set of nursing home licensing standards (Siau, 2014).

In addition, the nurse managers reported the success of Telegeriatrics in empowering nurses, and were keen to continue providing support needed to sustain the programme. The successful incorporation of telemedicine was reported to be mainly contributed by a supportive management that sees the need for its use (Moehr et al., 2006; Murray et al., 2011).

The nurses reported that their roles have expanded from the traditional nursing care. Prior to the programme, nurses were not required to present cases to geriatricians during their physical visits. Furthermore, they did not perform any physical examinations on the residents. During the programme, increased expectations were placed on the nurses in providing resident care. Nurses were expected to carry out specific roles in the assessment and management of patients with specific conditions. Nurses were also expected to bring forth their suggestions in the management of the resident. On top of this, they had to learn how to operate the videoconferencing equipment.

Despite increased expectations, nurses expressed that they have acquired more knowledge and confidence in coordinating care. They were proud of being entrusted with this expanded role. Although there was initial resistance in facilitating the telemedicine consultations and frustrations with the technological disruptions, the nurses accepted these challenges. They added that this new way of delivering care has been integrated into their day-to-day nursing practice. Nurses’ attitudes toward telemedicine are the key determinant to the successful implementation of a technology-related programme (Gamm et al., 1998). Therefore, it is important to ensure that nurses are prepared to accept new operational changes, which will not only alter current medical practice but also attitudes towards a programme that involves technology. In

addition, training and the presence of a support system assist the adoption and use of a new technology (Ash et al., 2003).

The geriatricians felt that it was plausible to use telemedicine consultations to manage some conditions on-site. However, they appeared to be more reserved in their acceptance of the programme. They found that the care provided over telemedicine was less satisfactory than traditional encounters', as they faced difficulties in building therapeutic relationships with the residents. Similarly, complications in clinician-patient relationships created by communication technology were observed in other studies (Weiner and Biondich, 2006). In relation to this, they and the hospital's administrators suggested that the telemedicine consultation should be a form of "relationship medicine" (Hixon, 2014). Telemedicine encounters should be remote only when trust between the doctor and the patient is established.

The geriatricians also articulated that not seeing the patients in person and their heavy reliance on the nurses were potential medical risks. These concerns reflect a sense of insecurity in relying on a medical system that has been prone to errors (Rowthorn and Hoffman, 2001; Sao et al., 2012). A study reported that the doctor took greater care in communicating with the patient in a telemedicine consultation than in a face-to-face consultation (Tachakra and Rajani, 2002). In the study, verbal cues were more frequently used to allow coordination of beliefs between both parties. Although telemedicine services have been piloted in a number of clinical domains, one of the main challenges in adopting these services includes the lack of clarity over legal liabilities (Commission Staff Working Paper on Telemedicine, 2009).

The main limitation of this study is its inability to assess patient satisfaction as most of the NH residents were either cognitively impaired, uncommunicative or both.

Another major limitation of this study is that due to its exploratory nature, some concepts that were not mentioned in the FGDs or the semi-structured interviews were not captured in this study. Further quantitative analysis can be explored to allow a clearer understanding of the relationships among individual factors. In addition, the moderator is a member of the acute hospital team providing the telemedicine services. Hence, there is a possibility that the users may provide responses that the moderator would like to hear. In order to minimize this form of bias, an acknowledgement of participation which clarifies the process and creates

a common expectation among participants was given before the discussion.

5 CONCLUSIONS

This study offers a better understanding of the ways in which Telegeriatrics had influenced the users, including its benefits and drawbacks in providing geriatric care. It identifies specific issues that can affect the user perception, and thus, it provides better guidance on how to proceed with subsequent quality improvement initiatives in order to ensure better care for NH residents.

Favourable attitudes towards the programme have made it possible to coordinate treatment plans for patients on-site, and to strengthen nurses' knowledge and skills in providing better nursing care. Telegeriatrics could be one of the solutions to compensate for the inadequate supply of geriatricians in Singapore, and play a part in the continuity of care between hospital and NHs.

While the nurses and nurse managers appreciate the programme and acknowledge that NH residents were better cared for, the geriatricians appeared to be less convinced. In many studies, the successful adoption of using telemedicine has been limited by the doctors' conservative perceptions (Siwicki, 1997; Coiera, 2003). As adoption of telemedicine mainly relies on the readiness and attitudes of healthcare professionals, efforts to actively engage the geriatricians are necessary for the continued operations of Telegeriatrics. In order for the hospital's administrators to achieve a user-driven design that will increase usability and acceptance, these professionals need to closely assess the geriatricians' needs and expectations.

The concern with the potential medical risks that comes along with the use of telemedicine highlights the need to ensure that professional practice standards are followed through and ethical standards upheld. The safety issues associated with telemedicine are more complicated and include not only anxiety about operating an equipment, but also concerns regarding possible adverse effects on patient management decisions through delayed or missing information, misunderstood advice, or inaccurate findings. Further research is needed in the area of patient safety as it is directly related to telemedicine practice.

Despite these concerns, the users believed that using communication technologies to provide health care is expected, and will be more often in the near future. The use of telemedicine has the feasibility to

extend specialist access to more areas of the community in the north of Singapore. The provision of continuous nurse education to prepare for technology use is also viable. As NH nurses play an integral part in caring for residents throughout the course of their illness, enhanced nursing knowledge and skills could lead to higher standards in the provision of long-term geriatric nursing care. However, it is emphasized that the use of telemedicine is a useful alternative to availing expert opinion, but will never replace traditional care.

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