The Promise of New Technologies in an Age of New Health Challenges
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How Nurses Use Telehealth to Support Health Transitions of Older Adults

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Abstract. When people with long term health issues transition from illness to health, or move from hospital to home after an exacerbation they feel vulnerable, unsafe, uncertain, lost, and unsupported. Transitions are life experiences that result in change. Telehealth gives easier access to care and increases patient involvement and self-awareness for self-care and improved outcomes. The purpose of our research was to explore how telehealth tools and processes lend themselves to nursing of patients through transitions. Methods A multimethod study with before and after questionnaires consisting of validated questionnaires. These were triangulated with nurse field notes, nurse assessment of each participant, exit interviews with participants, and questionnaire for referring clinicians about their experience of the service. Twenty patients, their five doctors, and two telehealth nurses, participated. Results PACIC questions revealed that participants felt more involved in decision making, self-care planning, referrals to other services, and understood more clearly their health issues. The Quality of Life questions showed improvement, and their health issues bothered them less after telehealth. The Perceived Health Competence questions showed an improvement in how they rated their health, and their ability to influence their health. Clinicians indicated that the service worked well, was appropriate and useful, and should continue. The interviews revealed that participants learned how to do self-care with insight, made the transition from hospital to home and from illness to a new way of being well, and referred the service to others like them. Discussion and conclusion We conclude that our experienced nurses used the tools of telehealth (monitoring of self-care and videoconferencing) to coach, supervise, guide, and accompany patients through an organizational transition for half our participants (from hospital to home) and all the participants through an illness to a new way of being well.

Keywords. Telecare, telemonitoring, nursing, health service, aged care, transitions

Introduction

The transition from hospital to home, or recovering from repeat exacerbations of long term health issues, can leave people feeling vulnerable, unsafe, unsupported, lost, and disempowered. This is particularly true if people are elderly, and have one or more long term health issue. Transition, as defined by Meleis and Trangenstein [5] is 'a passage from one life phase, condition, or status to another' (p. 256). Transition is both the

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process and the outcome of complex interactions between person and environment [6]. It involves a different kind of self-awareness, re-identifying oneself, becoming different [5-7]. Transitions are life experiences that result in change, e.g. adapting to a long term health issue (health-illness transition) or discharge from hospital to home care (organizational transition) [6]. Care transitions are defined as 'hospital discharge or movement from one health care setting to another'[7]. Nursing is concerned with assisting people who are undergoing transitions with well-being as the goal [5].

The Chronic Care Model (CCM) [8] frames how healthcare professionals should be prepared and proactive, and 'patients' (people with long term health issues) should be informed and activated so that 'productive interactions' can happen. These 'productive interactions' are integral to transitions. Gee et al [9] have modified the CCM to accommodate ehealth, framing the entire model in ehealth terms, which includes telehealth.

Telehealth (defined as technology-mediated healthcare from a distance) [10] shows promise in helping people with long term health issues to track and record their healthcare plan, and progress and outcomes [11, 12]. It gives easier access to care, e.g. videoconference and telemonitoring, in order to improve overall wellbeing. Telemonitoring is defined as 'an automated process for the transmission of data on a patient's health status from home to the respective health care setting' [13]. Telemonitoring is a component of telehealth. People with long term health issues, especially older adults, are at risk of avoidable hospitalisations, and reduced life expectancy and quality of life [12]. Telemonitoring has been shown to have an impact on preventing hospital admissions, reducing length of stay, and improving health outcomes [14], but not its role in facilitating care transitions.

Not all research shows unequivocally that telehealth makes a difference. A systematic review by Wootton [12] reveals that by 2012 health outcomes had not improved dramatically, and in many instances did not merit the adoption of telehealth services [12]. Recent research based in New Zealand settings (urban hospitals and rural primary care) shows that quality of life, self-efficacy, and disease-specific measures did not improve significantly. What was significant was that patients became more active in self-care as a result of raised self-awareness and the sense of safety and feeling more cared for [15]. It is this increased involvement and self-awareness that are of interest for nurses assisting patients in transition [6].

In New Zealand, health and care services are primarily provided by the government, and free at the point of care, i.e. in hospitals and associated services. Primary care is semi-private and patients pay a co-payment for services. Non-government organisations (NGOs) supplement these services. Private aged care services are available. Some of the services provided by such organisations include rest homes, hospital care, medication management, falls prevention, and care giver services [16].

Our research question is, 'How do telehealth tools and processes lend themselves to nursing of patients through transitions?' The question was not how effective or viable the service was, but how the nurses utilized the tools and processes for patient transitions to a new way of being well.

1. Methods

1.1. Recruitment and equipment installation

An NGO aged care organisation provided a telehealth service for six months. Five referring medical specialists and primary care physicians identified and recruited patients for the research. Of the 20 referred patients, ten had been discharged from hospital. All were dealing with changes in self-care resulting from exacerbations or changes in their long term health issues. People were recruited if they were over 60 years old, cognitively able to consent and learn to use the equipment, living in an area where broadband was available, and deemed by their physician to be clinically appropriate for telemonitoring.

Ethical approval was granted by the Health and Disability Ethics Committee on 20/5/2015, reference 15/NTB/84. The research was conducted between July and December 2015.

The equipment was installed in participants' homes according to their needs and the nurse assessment. Participants were shown how to use it. A wireless tablet for recording responses to telehealth questions was installed in each participant's home. Monitoring equipment was installed according to need, and included electronic thermometers, weighing scales, pulse-oximeters, and blood pressure measuring equipment. Schedules for regular measurement and video call appointments (via the tablet) were set up.

1.2. Data collection

This was a multi-method study as depicted in Figure 1. There were three stages: assessment and set up, service delivery and before and after questionnaires, and post service feedback. In addition to the data indicated in Figure 1, referring doctors and nurse specialists were asked to provide clinical diagnoses of their participating patient/s and any other data deemed clinically relevant. They defined the vital signs parameters to be used in the telehealth service.

In total 81 devices were installed in 20 homes. Most participants received a combination of devices. Field notes were kept about incidents, technology support requests and repairs of technology problems, and observations about how participants were coping. Participants completed self-monitoring activities and their data was sent to the telehealth nurse, who printed reports for their doctors. The data was used for their care. The nurses communicated with participants' doctors if and when clinically required.

1.3. Data analysis

The multi-method approach in Figure 1 aimed at triangulation to expand understanding [17], which resulted in comparing and contrasting the quantitative and qualitative data that were collected. Statistical analysis of the questionnaires was not practical because of the wide range of possible responses, i.e. most questions had five Likert scale answer options. The Central Limit Theorem states that statistical analysis is best performed on studies with large numbers of participants, preferably more than 25 [18]. Since our pilot study did not contain sufficiently large numbers for statistical analysis,

the quantitative data are presented descriptively and triangulated with the qualitative data. The interviews were thematically analysed [19].



Figure 1: Study design

2. Results

2.1. Demographics and health profile

Seventeen women and three men enrolled in the study. The ages ranged between 61 and 90, with most participants in the 70 - 84 age range. Twelve were New Zealand European, four were Maori, one was Indian, one was Samoan, and one not specified. All spoke English except for the Samoan person who requested an interpreter. They either lived alone (12), with their spouse (5), spouse and child (1), child (1), spouse and grandchild (1), or daughter and grandchildren (1). The 20 participants had 54 health issues (co-morbidities) including combinations of hypertension (13), cardiac issues (6), heart failure (7), airways disease (15), diabetes (5), and other (8). Nine participants were taking five or more medications (polypharmacy).

The nursing assessment about participants' senses, mobility, and cognitive status revealed that three participants had macular degeneration (one was 'legally blind'), one had cataracts, and 12 wore glasses. Three participants had issues with hearing. One had tinnitus and two had hearing loss but were not using hearing aids. In terms of ability to move around without assistance, there were combinations of limited movement, weakness, stiffness, and unsteadiness. One person could not use the weighing scales, and weighing was excluded from her care plan. One person was cognitively borderline and forgetful, requiring some reminder calls from the nurses. Her care plan was simplified and only one measurement (her weight) was prioritised.

2.2. The effects of participating in the telehealth pilot

The shortest enrolment in telehealth was eight days, and the longest was five months and two weeks (156 days). Almost a third of participants (seven) used the service for four and a half months (120 - 134 days). Responses to the PACIC questions revealed that participants felt they were more satisfied with how their care was organized, were shown how their healthcare actions influenced their health, and invited to discuss their health goals. They indicated a difference in being helped to make a treatment plan to fit into their daily activities, and were referred to additional services, e.g. dietitian. Participants shifted from 'almost never' to 'almost always' in the question about being told how their visits to other doctors/specialists helped their treatment. Participants indicated that there was more discussion on how to elicit support from family and friends, and that they were given ways to record daily measurements.

In response to the Quality of Life questions, participants had a low sense of health competence that improved towards the end of the programme by one level of improvement from very poor, up each level of the Likert scale. Two people rated their health as 'very poor' and no-one rated their health as 'excellent' before (Figure 2). Five participants who could not do physical activities before became one person after the service. Two people were not affected by their health issues before. After participating in the service eight said they felt unaffected by their health issues. Similarly there was a shift from six participants saying they could not do daily work, to one. Seven respondents had severe to very severe pain and this number did not change – it was not clear if the people with pain 'before' were the same as the 'after' people. Participants indicated that they could participate more socially after. This aligns with the positive shift in their energy and confidence in their health. Thirteen people were not significantly bothered by their emotional limitations 'before' and 18 'after'.



Figure 2: Rate your health, before and after

The Perceived Health Competence questions revealed that there was no change before and after except a one level shift to improvement for the questions about succeeding in projects they undertake about their health, generally being able to accomplish health goals, and able to do things about their health as competently as other people.

Half the participants had never used computers, while the other half had used their phone as a computer, tablet, laptop, or desktop computers. Nine participants were confident about using computers. In the 'after' questionnaire, participants revealed that they found the equipment easy to use (17), and did not find it intrusive (15). They indicated that the discussions with the nurse prevented serious problems (16), they

could manage their health better with the equipment in place (17), and they felt more secure and safe (17).

The three doctors who completed the clinicians' questionnaire revealed that they felt that daily monitoring improved the standard of services to their patients and elaborated to say that their patients felt supported, safe, and confident. They agreed that involving patients in their care via telehealth was useful for early intervention, increased patient insight, reduced anxiety (if used under the right circumstances), prevented hospitalization, and was a meaningful way of conducting a clinical consultation 'but not for everything'. They would recommend the service to their peers, and saw it as an adjunct to usual care. To improve the service, 'keep it going'.

Participants who were interviewed commented on how the telehealth service had affected their awareness of their health issues and how they responded to their state of health, rather than if the programme resulted in improved outcomes because they had incurable long term health issues. As their awareness grew, so did their ability to learn how to make different decisions about seeing a doctor or going to hospital, resulting in fewer visits and/or admissions. One participant said that when her 'dropsy' resulted in swollen feet, she 'just thought it was part of my health and I couldn't do anything about it,' and the nurse taught her when to go to the doctor. Aspects of their condition that they had been unaware of were raised and handled, e.g. fever. Exacerbations and aspects of their health that were difficult to self-manage were handled under nurse supervision, e.g. dealing with a COPD exacerbation without going to hospital. They stated that the nurses' abilities to solve their health problems and assist them into better health, were related to experience, background and expertise, and making self-care fun. This resulted in the ability to trust the nurses when their health took a downturn.

They found it easy to use the technology once they had got used to it and built it into their routine. Customer service was considered to be good in light of the responsiveness of the nurses, and the expertise and ability of the technical support team. They would recommend telehealthcare to others, saying that they are already recommending it to people like them.

Discussion and conclusions

Our research question was, 'How do telehealth tools and processes lend themselves to nursing of patients through transitions?' The tools were telemonitoring, videoconferencing, and nursing competencies. Other tools that emerged included telehealth competencies such as using the technology, addressing unexpected exacerbations and conditions that affected their patients' health, and being wellconnected in a clinical network, nurse maturity, and advanced abilities to coach, supervise, and accompany patients through transitions.

People go in and out of transitions as part of long term health issues, and the nurses in our study accompanied, supervised, coached, and intervened via telehealth, to help the participants with their transitions. The transitions we examined were illustrated by a hospital to home care transition and transitions from one state of illness-health to another (described by Meleis et al [6] as organizational and illness/health transitions respectively). The transition for half the participants began before discharge from hospital, while for the others it began during an exacerbation of their long term health issue. They were aware of being in this transition, as evidenced by their answers to the questionnaires (supported in the interviews). Most participants felt ready to discontinue telehealth when the nurse indicated that their need for it had ended. Some participants initiated the ending when they felt ready.

Factors that contribute to rehospitalisation include unclear expectations, lack of of communication breakdown. and continuity care. incomplete/inaccurate understanding of self-care actions (including medication) [7]. Our findings show that patients benefited from nuanced, regular conversations with their telehealth nurse, who in turn communicated with the associated clinicians when clinically indicated. Patients learned from doing their own daily measurements, and therefore clarified the meaning of their own data and understood what was expected of them. Under guidance from the telehealth nurse, patients were able to learn when to contact their doctor and why earlier rather than later, thus preventing a significant exacerbation of their illness and hospitalisation. Consequently, participants became more involved in their self-care and more socially outward in their activities as they perceived their own developing mastery of self-care associated with their new way of being 'healthy' within the confines of long term health issues.

Role ambiguity and incongruence between ideal and actual roles of clinicians during times of transition for patients can result in poor outcomes [20]. Participants appreciated that their well-connected and experienced telehealth nurse was able to link them to appropriate clinicians in their circle of care, or link clinicians to one another when appropriate. Telehealth competencies for nurses include communication and coaching skills, and the combination of clinical and technology skills, and supportive attitude were evident in how the nurses leveraged telehealth to assist participants through transitions [21]. Telehealth nurses therefore have the potential to reduce the effect of ambiguity and incongruence.

This pilot study's limitations were mostly associated with the small number (20 patients, two telehealth nurses, and five doctors). This was mitigated by structuring a multi-method study aimed at triangulation of results, and the use of validated questionnaires in the before and after patient surveys. Since this was a small pilot study and cannot be generalized to a larger population, although the conclusions can be used in similar settings (transferability) [17].

We conclude that our experienced nurses used the tools of telehealth (monitoring of self-care and videoconferencing) to coach, supervise, guide, and accompany patients through an organizational transition for half our participants (from hospital to home) and all the participants through an illness to a new way of being well. These productive interactions as described in the CCM [8] assist patients in making illness to health transitions. The duration of the transitions was determined by the participants' degree and complexity of illness, and their raised self-awareness, involvement in self-management activities, and willingness to learn new ways of taking care of themselves. Herein lies an opportunity for nurses to leverage the tools of telehealth to achieve the core function of nursing as defined by Meleis and Trangenstien [5], i.e. nursing '...is concerned with the process and the experiences of human beings undergoing transitions where health and perceived well-being is the outcome.' In the words of a participant, 'I couldn't put a value to this, its' too valuable.'

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References

- [1] Southern Cross University, *Feros Care's My Health Clinic at Home Pilot, Final Report*. 2014, Southern Cross University: Australia.
- [2] Richardson, J., et al., Measurement of the Quality of Life for economic Evaluation and the Assessment of Quality of Life (AQoL) Mark 2 Instrument. The Australian Economic Review, 2004. 37(1): p. 62 - 88.
- [3] Smith, M.S., Wallston, K.A. and Smith, C.A. The development and validation of the Perceived Health Competence Scale. Health Education Research, 1995. 10(1): p. 51 - 64.
- [4] Glasgow, R.E., et al., Development and validation of the Patient Assessment of Chronic Illness Care (PACIC). Medical Care, 2005. 43(5): p. 436 - 444.
- [5] Meleis, A.I. and Trangenstein, P.A. Facilitating transitions: redefinition of the nursing mission. Nursing outlook, 1994. 42(6): p. 255-259.
- [6] Meleis, A.I., et al., Experiencing transitions: an emerging middle-range theory. Advances in nursing science, 2000. 23(1): p. 12-28.
- [7] Geary, C.R. and Schumacher, K.L. Care transitions: Integrating transition theory and complexity science concepts. Advances in nursing science, 2012. 35(3): p. 236-248.
- [8] Wagner, E.H., et al., A survey of leading chronic disease management programs: Are they consistent with the literature? Managed Care Quarterly, 1999. 7(3): p. 56-66.
- [9] Gee, P.M., et al., *The eHealth enhanced chronic care model: a theory derivation approach.* Journal of medical Internet research, 2015. **17**(4).
- [10] Cottrell, E., Chambers, R. and O'Connell, P. Using simple telehealth in primary care to reduce blood pressure: a service evaluation. BMJ Open, 2012: p. 2:e001391.
- [11] Bowles, K.H., Dykes, P. and Demiris, G. The use of health information technology to improve care and outcomes for older adults. Research in gerontological nursing, 2015. 8(1): p. 5-10.
- [12] Wootton, R., Twenty years of telemedicine in chronic disease management-an evidence synthesis. Journal of telemedicine and telecare, 2012. 18(4): p. 211-220.
- [13] Paré, G., Jaana, M. and Sicotte, C. Systematic review of home telemonitoring for chronic diseases: the evidence base. Journal of the American Medical Informatics Association, 2007. 14(3): p. 269-277.
- [14] Riddell, T.T.A., et al., Assessing Maori/non-Maori differences in cardiovascular disease risk and risk management in routine primary care practice using web-based clinical decision support:(PREDICT CVD-2). 2007.
- [15] Kenealy, T.W., et al., Telecare for Diabetes, CHF or COPD: Effect on Quality of Life, Hospital Use and Costs. A Randomised Controlled Trial and Qualitative Evaluation. PloS one, 2015. 10(3).
- [16] Gauld, R., Questions about New Zealand's health system in 2013, its 75th anniversary year. The New Zealand Medical Journal (Online), 2013. 126(1380).
- [17] Morse, J.M., Critical analysis of strategies for determining rigor in qualitative inquiry. Qualitative health research, 2015. 25(9): p. 1212-1222.
- [18] Israel, G.D., Determining sample size. 1992: University of Florida Cooperative Extension Service, Institute of Food and Agriculture Sciences, EDIS.
- [19] Thomas, D.R., A general inductive approach for analysing qualitative evaluation data. American Journal of Evaluation, 2006. **27**(2): p. 237 246.
- [20] Schoenborn, N.L., et al., Clinician roles and responsibilities during care transitions of older adults. Journal of the American Geriatrics Society, 2013. 61(2): p. 231-236.
- [21] van Houwelingen, C.T., et al., *Competencies required for nursing telehealth activities: A Delphi-study*. Nurse Education Today, 2016. **39**: p. 50-62.