

Research and Theory

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Implementation of the concept of home hospitalisation for heart patients by means of telehomecare technology: integration of clinical tasks

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Abstract

Purpose: To explore how the implementation of the concept 'Home hospitalisation of heart patients' by means of telehomecare technology influences the integration of clinical tasks across healthcare sectors.

Theory: Inter-organisational theory.

Methods: The case study approach was applied. Triangulations of data collection techniques were used: documentary materials, participant observation, qualitative and focus group interviews.

Results: The clinical decision-making and task solving became multidisciplinary and integrated with the implementation of telehomecare and, therefore, complex in terms of the prescription and adjustment of patient medicine. Workflows between healthcare professionals across sectors changed from sequential to collective client flows. Pre-existing procedures for patient care, treatment, and responsibility were challenged. In addition, the number of tasks for the district nurses increased. Integration in the clinical task-solving area increases fragmentation in the knowledge technologies in a network perspective.

Conclusions: Implementing the concept of 'Home hospitalisation of heart patients' by means of telehomecare technology will result in a more integrated clinical task-solving process that involves healthcare professionals from various sectors. Overall, the integration of clinical tasks between hospital and district nursing will result in a direct benefit for the heart patients.

Keywords

telehomecare, home hospitalisation, healthcare professionals, integrated healthcare networks, coordination and integration of tasks

Introduction

Today's healthcare system appears to be fragmented in several aspects of the cross-sector coordination of patient care and treatment. The fragmentation manifests itself in multiple areas. In terms of organisation, the fragmentation may arise on account of the healthcare professionals asserting their right to conduct specific tasks across sectors by e.g. claiming a monopoly on concrete task assignments [1]. The cooperation structures among healthcare professionals are characterised by formal cooperation agreements that were made at the strategic level. In practice, the patient-related cooperation and task solving is often founded on mutual consent and informal organisation, not always in compliance with general policies. In this respect, there is a lack of cohesive power and integration between the sectors. In addition, there is insufficient infrastructural support of horizontal processes in a patient-care process in terms of quality assurance, information systems and financial systems. Insufficient infrastructural support of horizontal processes in patient-care may be a result of each sector focusing on singular functions. A network perspective would lead to a stronger infrastructure support [2].

Applying telehomecare technologies and electronic information systems in a cross-sector cohesive patient-care process brings about change in healthcare organisations and opens up new possibilities for service delivery and supporting integrated care working [3, 4]. The term 'telehomecare' denotes care and treatment cutting across sector lines by means of information or communication technology. The question is whether the use of telehomecare technology strengthens the infrastructure to support integrated care?

Prior research on the implementation of telehomecare technology and clinical task solving across sectors on the operational level is limited. Most studies have been conducted in rural and remote areas. According to Aas [5] the integration of telemedicine and telehomecare in work processes improved coordination of care coordination of care. Cooperation aided by telemedicine seems to work well and may be influenced by factors such as the personality of the healthcare professionals involved, their personal relations, preparation and experience. It has been shown that task solving within telehomecare or telemedicine depends on the applications; however, further research is needed to clarify this [6,7]. In the UK, integration of telehomecare services has been difficult and clinicians find it hard to integrate telehomecare services into their deeply embedded local working

structures. Additionally, it has been reported that, problems arise due to the complexity of the operational changes that results after the implementation of telehomecare technology [8].

A longitudinal study of the implementation process of telehomecare in rural and remote areas of Canada identified that telehomecare would help create networks between hospital and primary care providers but widespread use of telehomecare has not been reached [9]. The implementation of telehomecare has yet to be integrated into routine clinical practices in a systematic way.

This paper reports on a part of a research project, namely 'Home hospitalisation of heart patients' by the use of telehomecare technology in the local environment. The issue in focus is the implementation of the concept and how integrating telehomecare technology will influence the daily clinical work of healthcare professionals as viewed from an inter-organisational perspective.

The overall objective of the research project was to explore, develop and empirically implement the concept of home hospitalisation for heart patients by means of telehomecare technology. The concept was designed on the basis of the following assumptions: that heart patients are able to achieve a more accurate medicine adjustment in home surroundings, a shorter hospital stay, a better quality of life and improved reconvalescence. In addition, this study set out to explore how telehomecare technology may support integrated care when cutting across organisational, institutional and professional boundaries. The research question in this study was:

How does the implementation of the concept of home hospitalisation for heart patients by means of telehomecare technology influence the integration of clinical tasks between hospital and district nursing?

The research issue was explored in a case study involving the cardiology ward at Vendsyssel Hospital in Frederikshavn, Denmark and district nurses in the Municipality of Frederikshavn. Patients with heart failure, arrhythmia and patients up for medicine adjustment were included in this study. The study was conducted for duration of eleven months.

The concept of home hospitalisation of heart patients

The study consisted of a design phase and an implementation phase. The overall framework of the research project was determined at Aalborg University, and a multidisciplinary design panel of 12

members included a head nurse, two staff nurses, three nurses, one representative of the general practitioners, three managers of district nursing communities and three district nurses was assembled. The objective of the design panel was to develop, plan and facilitate issues in the implementation process of the home hospitalisation concept by means of tele-homecare technology. Specific issues that were considered were the design of cross-sector workflows aided by telehomecare technology, including work assignment, delegation and division of responsibilities related to clinical task solving, command and communication structures. The panel convened for six 2-h meetings and the attendance for each meeting was 90% or more.

The design panel developed a concept for home hospitalisation of heart patients supported by the use of telehomecare technology was developed. The

concept included agreements on clinical procedures and how to transfer heart patients from traditional hospital admissions to home hospitalisation. The traditional patient-care process for patients with heart failure, arrhythmia and patients up for medicine adjustment typically requires three to six days of admission to the cardiology ward. Once admitted in a traditional hospital, a heart patient may have their medicine adjusted, have their heart rhythm, blood pressure, pulse, and weight measured, in addition to having daily blood tests for anticoagulation therapy (INR-International Normalized Ratio).

The home hospitalisation concept is a new method that was intended to improve patient-care processes, provide clinical task solutions and increase the sharing of patient information. This new concept is a departure from current practice in both sectors. The home hospitalisation concept requires the heart patients to be

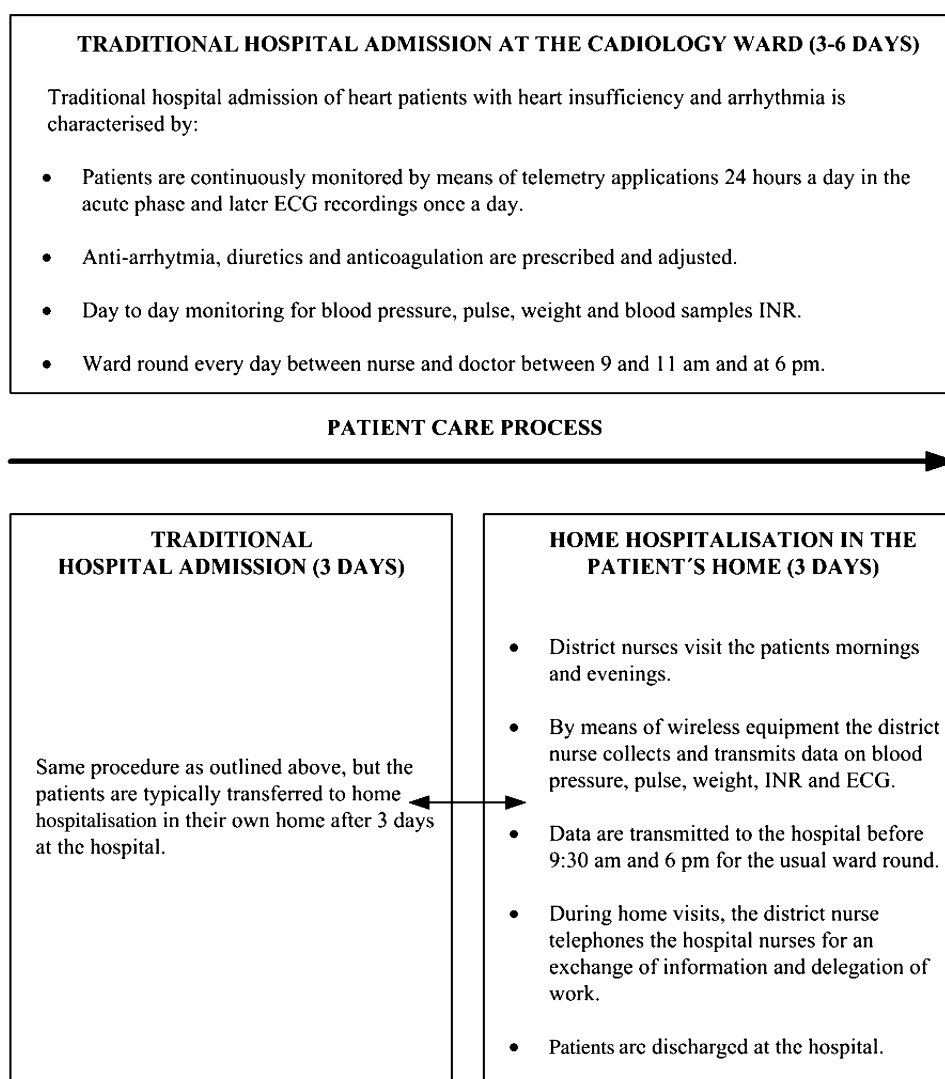


Figure 1. The difference between traditional hospital admission and the concept for home hospitalisation of heart patients.

admitted to a traditional hospital for three days before being transferred to their home, as shown in Figure 1. While at home, the patients would be visited by a district nurse in the morning and then again in the evening. The district nurse would collect the patient's blood pressure, pulse, weight, INR and electrocardiograms (ECG). The patient's information would then be transmitted by means of telehomecare equipment to the hospital where healthcare professionals could access this information by a joint web-portal. In addition, the district nurse would write and transmit a brief commentary about the patient's current health condition. The hospital staff would receive the ECG recording in e-mail such that the doctor could analyse the ECG by means of a software application.

Observation of the heart patients, taking ECG and blood samples (INR) measurements were new responsibilities for the district nurses. Currently, the doctor would assume these responsibilities once the patient was discharged from the hospital. Therefore, the district nurses that were involved in this study were trained in ECG recording and INR measurement techniques. In the design phase of the concept for home hospitalisation the division of these responsibilities were heavily debated amongst the design panel. In relation to current practice the responsibility for the treatment of the patients admitted at home remained with the doctor in charge at the hospital. The GP did not have any patient responsibility until the patients were discharged.

The heart patients were included in the project on the basis of inclusion and exclusion criteria. The heart patients were typically past the acute phase of their condition. At the time the patients were selected for home hospitalisation they were able to walk around without dyspnoea. The heart patients had been admitted to hospital typically for three days before they were admitted at home. Home hospitalisation lasted three days.

The heart patients GP were informed by fax that their heart patient had been admitted to home hospitalisation. In the event of emergency (anxiety, complications, etc.) the patient would be readmitted to hospital. Patients may also be instructed to return to the hospital after being assessed by their doctors or the visiting nurse.

The design panel held a meeting to discuss the experiences and resolve the issues that occurred after the home hospitalisation of three patients. These issues included the adjustment and coordination of workflows across sectors, comprehending written documentation by other healthcare professionals on the joint web-portal as well as the difficulties on the part

of the hospital staff to reach the district nurses on the phone.

Conceptual framework

An inter-organisational perspective within the Scandinavian research tradition [10–12] constitutes the conceptual framework for this study. The definition of a network was adopted from Alter and Hage [13]:

Networks constitute the basic social form that permits inter-organizational interactions of exchange, converted action, and joint production. Networks are unbounded or bounded clusters of organizations that, by definition, are non-hierarchical collectives of legally separate units [13, p. 46]

Traditional organisational theories fail to address the network issues and only deal with the parties, which separately conduct their share of the combined processes and tasks [14] and therefore fail to address network issues. The world is regarded from a hierarchical (pyramid) perspective and traditional organisational theories, therefore, have difficulties in capturing the inter-organisational challenges. In contrast, inter-organisational theory opens up organisational boundaries and introduces new forms of inter-professional relations, collaboration and task solving.

Based on a general inter-organisational model by Gustafsson [14] a network may be described by four main elements: parties, processes, vision and architecture. Network *parties* are the resources of the network. The *processes* present information exchange, coordination and joint task solving between the organisations, and are subject to the situations and contexts. In network relations the keyword is trust. A network *vision* is the mutual interest for the involved parties. The *architecture* of a network is the structural framework that constitutes the form and content of collaboration between the parties and is the legal foundation and organisational structure. The norms and values that govern the interaction between the parties and organisations are defined as the network culture. Competences such as the mental models and attitudes of the parties or their knowledge and skills of the parties are attached to the parties in the network.

The parties' parent organisations and task environments are located outside the network. The term technology is attached to the parties. The technology in an organisation is the knowledge, tools, techniques and actions used to transform inputs into output. Technologies appear in the processes related to the overall task solving in the network. Alter and Hage

[13] suggest that technologies should be viewed as task dimensions. In this study, task dimensions involve the clinical task solving that occurred across sectors on the operational level when the concept of home hospitalisation of heart patients was implemented.

Alter and Hage emphasise that coordination in a network is a method or a process – not an outcome. Coordination in a network takes place at all hierarchical levels and different methods to achieve coordination within a network at each level may be required [13, p. 90]. Additionally, Alter and Hage highlight three methods for task integration. These methods for task integration were originally inspired by Thompson [15], who developed a theory on technology work processes.

The technology of a work process can be interrelated and problems that occur in one part of the system may affect other parts of the work process. The work process has been described as three independent workflows (1) sequential client flow, (2) reciprocal client flow and (3) collective client flow. Integration of these workflows into the inter-organisational field has resulted in modified definition of these workflows [13, p. 95]:

- *Sequential client flow* is where the patient is treated by one ward/district and care and treatment is terminated before the patient is referred to the next ward/district.
- *Reciprocal client flow* is when a patient is treated at the same time by more than one ward/district.
- *Collective client flow* is where the patient is treated at the same time by staff from different wards/districts, which develop treatment plans together and share tasks in a systematic way.

Coordination and task solving resemble the proverbial two sides of the same coin, so to speak. They are inter-related and both have to be considered when talking about telehomecare technologies that merge two sectors in the healthcare system. However, to Alter and Hage [13] technology is limited to task dimensions:

“Task scope is the degree to which tasks are variable and require a multidisciplinary or multidimensional approach” [13, p. 117]. Various professions have broadened their knowledge base, and they are encouraged to work in an interdisciplinary way and to improve the quality of work. The variable task scope is to capture this evolutionary process.

“Task uncertainty is the extent to which task processes or interventions have knowable outcomes” [13, p.119]. There are some kinds of work where the outcome is unpredictable for a long time.

“Task complexity is the interaction of task scope and task uncertainty” [13, p. 119]. The complexity of the

task consists of the considerations and unknown elements to be taken into account in the process of task solving.

The scale and complexity of a problem determine the forms and processes of inter-organisational networks, particularly when they involve collaborative work [13, p.122]. Alter and Hage have the hypothesis that as the complexity of technologies increases there is an increasing pressure towards coordination and integration.

Defining coordination and integration

Axelsson and Axelsson [12] have developed a conceptual framework on integration of workflows between the sectors. They argue that there are many different contradictory definitions of concepts like coordination, cooperation and collaboration between sectors are unclear due to contradictory definitions with the literature – this is typical for a new research area [16, p.76]. This study uses the framework on integration developed by Axelsson and Axelsson for the purpose of having “an analytical tool” to explore if the implementation of the concept of home hospitalisation for heart patients by means of telehomecare technologies has a positive impact on the integration of clinical task solving across sectors. The definition of integration used in this study was:

The quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demand of the environment [17, p.11].

Additionally, the framework for integration can be divided into vertical and horizontal integration. *Vertical integration* occurs between organisations or units on different hierarchical levels whereas *horizontal integration* occurs on the same hierarchical level.

Coordination can be defined as integration with a high degree of vertical and a low degree of horizontal integration. Integration and decisions are made at the top of the hierarchical structure and implemented at lower levels in the organisation. *Contracting* is a form of integration with a low degree of both vertical and horizontal integration. There is no integration at this level. *Cooperation* is a form of integration with a high degree of both vertical and horizontal integration. Cooperation is based on hierarchical management and combined with voluntary agreements and mutual adjustment between organisations. *Collaboration* is a form of integration with a high degree of horizontal integration but a low degree of vertical integration. Collaboration is based on voluntary agreements and mutual adjustment between the organisations.

Methods

The research question of this study demands an inductive and explorative methodology that would facilitate the emergence of new understandings. The case study [18,19] approach is therefore applied as the overall method.

Data collection process

Data collection on the clinical task solving was organised to take place both before and after the implementation of the concept of home hospitalisation of heart patients by means of telehomecare technology.

Design phase

The aim of the design phase was to explore and gain an understanding of the phenomena, concepts and the complexity of the inter-organisational and inter-professional landscape within the health care sector. Documentary material such as: formal agreements on hospital admissions, task solving and discharges between the district nurses and Vendsyssel Hospital, homepages, staff news, descriptions of task and work processes at the hospital and for the district nurses in the Municipality of Frederikshavn were reviewed and considered.

At the same time participant observation [20,21] was carried out at the hospital by accompanying nurses and doctors on the cardiology ward. The purpose of observing the nurses and doctors was to acquire an understanding of the work culture, clinical work procedures and the tasks performed by healthcare professionals in addition to the clinical review of the patients. In a similar fashion participant observations were also carried out at the district nursing communities. Field notes were recorded for each participant observation session.

Subsequent to participant observations and document reviews qualitative interviews were conducted [22, 23]. Individual interviews were first conducted with representatives of the various professional groups, viz. nurses, hospital doctors, general practitioners, hospital managers, district nursing managers and district nurses who served on the design panel. In order to bring the issues into a broader forum for discussion, respondents (see Table 1) not serving on the design panel were interviewed on the same issues. In this way new themes could emerge. Non-panellist respondents were randomly selected from staff. The purpose of the interviews was to assess the tasks and duties related to the care and treatment of heart patients and to reflect on the flow in the patient-care process.

Table 1. Survey of interviewed respondents in the design phase

	Design phase
Nurses at hospital	2
Nurses on the design panel	2
Doctors on the design panel	1
Doctor at the hospital	1
General practitioner on the design panel	1
District nurses	2
District nurses on the design panel	2
Management of hospital on the design panel	4
Management of district nursing on the design panel	3
Focus group interview with design panel	1
Total number of interviews carried out	18

The interviews were approximately 1.5 hours, semi-structured, and were always performed by the same interviewer. The last step in the design phase was a focus group interview [24] conducted by the design panel. The purpose of the focus group interview was to validate the data that were collected from the participant observations and individual interviews.

A focus group interview [24] was carried out with the design panel at the end of the design phase. The purpose was to validate data collected through participating observations and data from the interviews.

Implementation phase

The aim of the implementation phase was to implement the concept of home hospitalisation of heart patients by means of telehomecare technology into clinical practice. Participant observations were carried out as well. The aim of participant observation was to observe the clinical task solving related to heart patients admitted at home. The participant observations took place during cardiology ward rounds, day-to-day clinical tasks, procedures involving the heart patients at the hospital, the transfer of patients from hospital to home hospitalisation and district nurses' patient-home visits.

The implementation phase consisted of individual interviews as well. The same strategy for conducting and selecting respondents for the interviews in the design phase was applied in the implementation phase. However, in this phase the hospital and district nurses that gave the interviews were the ones who had been actively involved in the project. The purpose of the interviews was to (1) acquire insight into the clinical task-solving across sectors following the implementation of the concept of home hospitalisation for heart patients by means of telehomecare technology (2) to validate observations and (3) have the

Table 2. Survey of interviewed respondents in the implementation phase

	Implementation phase
Nurses at hospital on the design panel	3
Nurses at hospital	3
Doctor on the design panel	1
Doctor at the hospital	1
Secretaries at the hospital	2
District nurses on the design panel	2
District nurses	3
Management of hospital on the design panel	4
Management of district nursing on the design panel	3
Focus group interview with nurses at hospital (4 persons) (not on the design panel)	1
Focus group interview with district nurses (4 persons) (not on the design panel)	1
Focus group interview with design panel	1
Total number of interviews carried out	25

respondents' reflections on the new means of clinical task-solving and work procedures.

The secretaries at the hospital were also interviewed in order to gain an insight into the administrative procedures related to the project. The interviewees in the implementation phase are listed in [Table 2](#).

In a similar fashion to the design phase a focus group interview was also carried out in the implementation phase. Selection of the respondents for focus group interviews with nurses at the hospital and district nurses was based upon their active involvement and measure of experience with taking care of the patients included in the study. The purpose of conducting the focus group interviews was to clarify the unique and typical characteristics of the clinical task solving across sectors in the implementation phase of the home hospitalisation. All respondents gave their oral consent to interview participation. Interviews were tape-recorded and transcribed (876 pages in total). The same person made all transcriptions.

Computer assisted qualitative data analysis

NVivo 2.0 software used to code the interviews, and a combination of etic and emic coding was used in the analysis of data [25, p. 10–2]. The transcribed interviews were analysed in the following steps:

- Design of a code tree, comprising nodes, descriptions/definitions of nodes and child nodes were done in dialogue with a research colleague. The code tree was formed on the basis of central concepts (in vitro nodes) from the conceptual

framework (in vivo nodes) from interviews conducted with respondents.

- All interviews were reviewed to achieve an overall impression of the topics and context.
- Rough and refined coding as a result of reviews of coded material and adjustments both in the code tree and in the coding of interviews.
- This step aimed at the identification of topics and patterns. The interpretation was widened to include a framework of understanding beyond the respondent. What was the topical content of the interview, and what motivated the views? What was the scope of potential actions? This phase included an in-depth interpretation held up against common-sense understanding. In this phase the interviews were analysed with a view to inferring motivations and underlying perceptions.

In the final phase, data were analysed in continuous dialogue with research colleagues. This process was based on the conceptual framework, data from observations, and documentary materials with a focus on the research questions – all in order to be able to derive unique and typical characteristics. The data were examined for new emerging themes as well.

The application of a computer programme is associated with a certain bias. Firstly, a decontextualisation of data occurs. Secondly, the programme has been developed on the basis of ground theory – an inductive approach – and in this project a combined code strategy is deployed. Thirdly, the application of the software gives the researcher a 'feeling of being distant' from the data. The reliability of the data was established by involving all authors in data interpretation and the development of analytic themes.

Ethical approval was obtained from the local Ethics Committees. The study was performed according to the Helsinki declaration.

Results

Task scope

The tasks of the district nurses are expanded (e.g. ECG recordings, taking and measuring INR blood samples). District nurses are assuming joint responsibility and are involved in the clinical decision-making processes, thus becoming part of the hospital's patient-care team.

Clinical decision-making becomes a multidisciplinary decision-making process involving the district nurse, the hospital nurse at hospital and doctors. The task scope is expanded for each group due to virtual ward

rounds. *“This gives all of us the possibility to share data... We can also discuss observations and exchange suggestions for improvement of the care and treatment for the individual patient”.*

Task uncertainty

Nurses and doctors find it difficult to ‘let go of’ the patient for home hospitalisation. “From a nurse’s perspective it means ‘letting go of’ the patients at an earlier stage than we’re used to – and as a result we’ve been more preoccupied with this issue than learning how to use the new technology” (hospital nurse). Field notes from observations on the cardiology ward show that the hospital doctors express difficulties in finding the right patients.

The district nurses find that the patients expect them to have in-depth domain knowledge of heart diseases and their treatment similar to hospitals nurses. The district nurses express this as follows, *“I’m happy to answer the patient’s questions about heart conditions, but I don’t have the same knowledge as the nurses at the hospital. It’s quite confusing, but the question is how much do I need to know?”* and *“It’s a new segment of patients, who in fact in some contexts are stronger on resources than some of the patients we normally deal with”.*

Task coordination

Nurses at the hospital find that they have to discharge the same patient twice in an administrative manner (for example when the patient is being home hospitalised and again when the patient finally is being discharged from the hospital).

Patient data are shared and coordinated via joint web-based patient records, which opens up the opportunity of synchronous communications. *“The joint web-journal is a necessary tool as part of the concept, if we are required to adjust the anticoagulant therapy on a daily basis. It helps to enhance security and enables us to coordinate tasks at the same time”* (district nurse).

The initial difficulty is the coordination of workflow between two organisations within a given timetable and framework (for example telephone hours of the GPs, and scheduled hours for blood-sample taking at the hospital). *“We at the hospital are frustrated because it’s extremely hard to be in touch with a district nurse – we have to call umpteen phone numbers before we happen to reach one. And when we call, we should have called before 1 p.m., and then we have to call back again the next day”.*

New emerging themes discovered after coding and analysing the data:

Task complexity

District nurses find it stressful to meet the agreed deadlines with the hospital for data transmissions from the patient’s own home by 9:30 am. *“In regard to time it’s difficult to send data and so on by 9 a.m. – I also have to squeeze in administering insulin and eye drops – it’s difficult to coordinate things according to the hospital’s workflows”* (district nurse).

The daily process of prescription and adjustment of patient medication becomes more complex because it involves the district nurses.

The concept of home hospitalisation by means of telehomecare technologies challenges existing procedures for care and treatment as well as the area of responsibility of the healthcare professionals across sectors. *“Why do we have to disinfect the patient’s skin before we take a blood sample? It’s all very well that they do so at the hospital, but we are not used to doing it to the patients”* (district nurse) and *“It can be difficult for us to assess the [patient’s] home environment, when we only know the patient from here at the hospital”* (nurse at the hospital).

Workflows change from sequential client flows to collective client flows. Observations described in field notes indicate a change in coordinating the clinical tasks. The decision-making processes take place at the operational level. The relationship between the nurses at the hospital and the district nurses evolve from feelings of reservation to trust and respect, and they make mutual adjustments to solve the clinical tasks “in the best way possible” to avoid patients being “kept hostage” between the two sectors.

Quality of task

Healthcare professionals consider home hospitalisation to benefit heart patients because the process of observation, prescription and adjustment of medication all take place in the patient’s home surroundings. *“The patients are satisfied with this new admission form, they report on more freedom and claim to get back to everyday life more easily – we take this as an improvement of our joint service”* (focus group interview).

The healthcare professionals find that they can plan and carry out a more individual care and treatment plan for the patient. *“In that the patient is observed both in the hospital and at home during his or her*

own everyday routines we are better equipped to give advice and guidance to meet the exact needs of the individual patient” (doctor).

Discussion

As for the research question the results of the study at hand indicate that telehomecare technology will transfer clinical tasks from the hospital to the primary sector. Some aspects of task dimensions are affected and new aspects have been identified.

The district nurses in particular experience changes in task scope as also seen in a corresponding study [26]. In the hospital, doctors and nurses experience the clinical decision-making process becoming more multidisciplinary because of the involvement of the district nurse in the process. This may prove to be advantageous to the patient as there is a health-care professional to observe the patient in his/her own home. The district nurses experience this as quality in the task solving as it enables a more individualised care and treatment plan. This is a new aspect, which emerged in the data analysis process.

Task uncertainty is seen in several areas. Nurses and doctors at the hospital find it difficult to transfer patients to home hospitalisation. This phenomenon has been witnessed in corresponding studies [8], and may be attributable to the project being in its initial phases. The district nurses experience uncertainty in connection with the clinical task solving because the patients are demanding in-depth domain knowledge. The question is how extensive domain knowledge is required of the district nurses. We have not been able to identify studies on this issue, and research into this particular question is deemed relevant.

Concerning clinical task coordination, an evolution has taken place from a sequential client flow to a collective client flow. Field notes indicate an evolution from a coordination of the clinical tasks toward a high degree of horizontal integration and a low degree of vertical integration. The concept of home hospitalisation of heart patients by means of telehomecare technology has caused a movement toward a more integrated [12] clinical task-solving process across sectors. The healthcare professionals perceive this to benefit the patient.

The virtual ward round and joint web-based patient records all help to make the clinical decision-making process run smoothly and unhampered to a certain extent, irrespective of context, time and space. These results may be argued to indicate that the use of telehomecare technology can support the cross-sector

infrastructure. The question is whether the concept of telehomecare technology may help to reduce the fragmentation of the healthcare system as far as context, time and space are concerned. Here it is important to look at the type of technology used. In a study using video technology for the home treatment of foot ulcers, district nurses are able to be in contact with an expert at the hospital and have a face-to-face real-time communication while performing patient treatment [27].

Prior research has shown that an overall integration of telehomecare technology is problematic because of the ways that innovations disturb and destabilise the existing institutional, professional and inter-organisational structures [28]. An example from this study is task complexity. On one hand the healthcare professionals perceive more integration in the clinical task-solving. On the other hand, they at the same time experience complexity and disagreement in task dimensions [13] in the inter-organisational landscape about whose knowledge technologies to follow. The question is if integration in one area may increase fragmentation in another area? In this case the fragmentation issue was knowledge technologies. It is not possible to generalise upon this case study but it can indicate some typical aspects of the implementation of the concept and the telehomecare technologies across sectors.

Conclusions

The implementing of the concept ‘Home hospitalisation of heart patients’ by means of telehomecare technology will result in a more integrated clinical task-solving process that involves healthcare professionals from various sectors.

The district nurses in particular experience changes in tasks. The clinical task coordination evolves from a sequential client flow to a collective client flow. Integration in the clinical task-solving area increases fragmentation in the knowledge technologies in a network perspective. Overall, the integration of clinical tasks between hospital and district nursing will result in a direct benefit for the heart patients.

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