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The Role of ICT in Home Care

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Abstract. With an ageing population and limited resources, ICT is often mentioned as a solution to support elderly people in maintaining an independent and healthy lifestyle. In this paper, we describe how ICT can support access to information and rationalization of work processes in a home care context. We do this by modelling the workflow and identifying the possible impact of ICT. The results show a complex process and indicate that the available resources are not used in the best possible way. The introduction of ICT could increase patient safety by reducing the risk of misplacing information about the care recipients and at the same time provide real time information about the care recipients' needs and health at the point of care. However, to rationalize the work processes there is a need to combine ICT with a changed procedure for handling keys.

Keywords. ICT, home care, information access, work processes

Introduction

Healthcare systems are struggling to meet the needs of a growing elderly population. Information and communication technology (ICT) is one of the proposed solutions to assist older citizens in maintaining a healthy and independent lifestyle and to provide good care at home [1-3]. Previous studies report that the use of ICT in home care can improve communication between professionals and care recipients, improve access to care and have positive effects on management of symptoms in daily life and follow-up care [2]. Other benefits include enhanced exchange and sharing of information and documentation at the point of care [4]. In the area of home care, prior studies have described issues related to adoption of ICT [5], communication between care recipients and healthcare professionals [2] and the development of different solutions [6]. Several studies have also focused on specific types of ICT, such as vital sign parameter measurement, audio-video teleconsultation [6], applications for people with chronic diseases [2] or standard solutions [6]. Even if information and decision support systems have been extensively studied in primary and hospital care, it has been less common in the home care area [6]. Therefore, it seems to be a need to provide more in-depth understanding of how ICT can support home help personnel and its impact on work processes [5; 7]. In this study, we describe how ICT can support access to information and rationalization of work processes in home care. We accomplish this by modelling the workflow of a home care group that considers implementing ICT.

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Case Description

The municipality of Jönköping, Sweden, offers help and care to elderly citizens to support them in an active and independent lifestyle. This includes to live at one's own home as long as possible instead of moving to a retirement home [8]. The municipality mainly ensures this through a home care service that gives elderly people various kind of support in their own home [8]. When an elderly person can no longer cope with the daily activities, he or she can apply for assistance from the municipality. Examples of support include home-delivered meals, cleaning, social activities and assistance with medication. Elderly citizens can also apply for support during the night as well as a personal alarm watch that can be used for emergency situations.

In this study, we focus on a home care group that consists of 60 employees who support 100 citizens on a daily basis and 5000 citizens who have a personal alarm watch. The shift that works between 21.00 and 03.00 every night is known as 'the night patrol'. They have access to nine cars that are manned with two persons each who are responsible for three districts in the municipality. This study concentrates on one of these districts. Even if the home care personnel have a mobile work situation they rarely have access to mobile technology to support their work. Usually, they access and register information in different information systems when the return to the office or on paper, or both.

1. Methods

The study was conducted as a descriptive case study [9] to gain insights into how ICT can support a home care group in their work processes. A qualitative approach was used to understand the complexity of the work processes in the home care group. First, a semi-structured interview was conducted with a representative of the company that delivers the management system (MS) to the municipality. The aim of the interview was to gain an understanding of the possibilities to develop a mobile service that could be implemented in the studied setting. Thereafter, the first author attended a meeting where the service developer and representatives from several municipalities in the region discussed the possibility to develop a mobile service. This gave us an initial understanding of how ICT could support the home care personnel.

To identify the workflow in the studied case, we observed the work that was carried out by the night patrol. This allowed us to understand which kind of decisions that were taken, why they were taken and their implications. During the observation, we had the possibility to ask the home care personnel about alternative decisions that could have been taken, if they would have access to ICT and the potential effects of such decisions. The observation lasted for one entire work shift (nine hours) where the first author followed the home care personnel as they performed their work. During the observation, the author observed the communication between personnel in the office, the transportation routines, the support given to elderly and the documentation of work activities. Due to the length of the observation, it was possible to ask questions and take notes at several occasions and in different situations. These notes were later organized according to the topics of information access and rationalization of work processes. When the participants said something particularly revealing we tried our best to capture the words used [10]. Based on the observation, we designed a process chart that described the current workflow as well as how ICT could be supportive (Figure 1).

The results from the observation were compared to the municipality's own process description and the process chart was further described to reflect reality in detail. To validate and strengthen the accuracy of the results gathered, we held a workshop with representatives from the home care personnel and representatives from the IT-department. During the workshop, we presented and discussed the description of the workflow and how ICT could support access to information and rationalization of the work process. A strength with case studies is the possibility to include different data sources and techniques to increase the accuracy of the results[10]. In this study, we have used triangulation by including different sources of information; an observation, a workshop and documents. A limitation in participant observations is the need to be at the right place at the right time [9]. To avoid this problem, a group of two home care employees was followed as they moved in the same car. During the research process, we have also acknowledged that there is a risk that the researcher tends to agree with the studied group [9].

2. Results

First, we describe the workflow of the home care group. Then, we complement these findings with a description of how ICT can support access to information and rationalization of work processes.

2.1. A Description of the Current Workflow

When the home care personnel of the night patrol arrived at their shift at 21.00, information was accessed and communicated in several ways. First, a verbal report was given by the employee who worked during the day shift. Then, the employees read through a notebook where colleagues had reported general information about performed activities. A common e-mail account was also accessed to read information from the management. Then, the employees individually accessed the MS to read newly documented information about each care recipient.

The employees started with dividing the responsibility for planned activities and unplanned activities (alarms) among the personnel and the cars that they had access to. Employees that were responsible for planned activities, accessed the MS and controlled the scheduled activities for the night. The colleagues that worked during the day had also printed the night's schedule on paper. The employees then gathered the keys to the care recipients on the night's route, double-checked their addresses and brought the printed copy of the schedule. They then drove to the care recipients on the scheduled time. When it was possible to return to the office, they documented information about the performed activities in the MS and the case management system (CMS). If the employees had made notes on paper about performed activities, they were shredded.

The other group of employees attended to unplanned activities i.e. when an elderly used his or her alarm clock. When an alarm was made, the alarm centre contacted the patrol and gave them information about the care recipient, his or her address and if possible information about the reasons for the alarm. The employee who received the alarm took notes on a paper and then returned to the office to gather the key to the care recipient. Before the personnel left the office, they read up on the information about the care recipient to be informed about his/her situation. The information about the care recipient had been printed previously, from the MS, and put in a binder since they

experienced it to be a more effective way than to log into the system. They also verified the address to the care recipient. When the home care personnel arrived at the care recipient, they acknowledged their arrival to the alarm centre by pressing the care recipient's alarm. When the elderly person had been assisted, the personnel returned to the office to document the information in the MS and the CMS. The shift ended with a verbal report to the 'day patrol'. It is important to stress that an alarm could be received whenever and wherever, which meant that the personnel were often disrupted when they were assisting care recipients or documenting information. The boxes with dotted lines in the figure indicate parts of the process that can be supported by ICT.

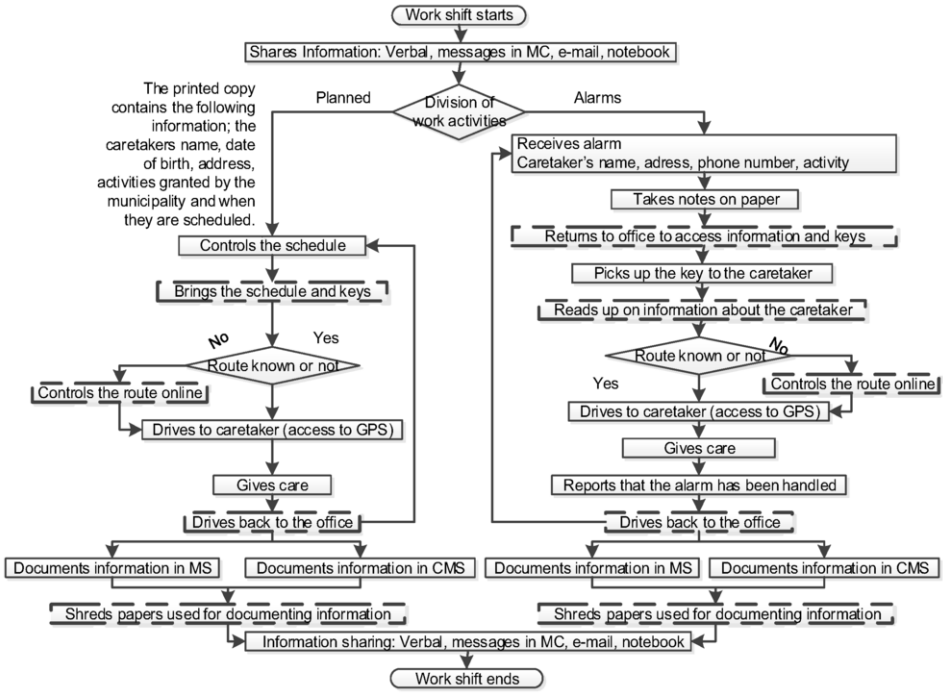

Figure 1: Description of the workflow of the 'night patrol' and where ICT can support access to information and rationalization of work processes.

2.2. ICT, Information Access and Rationalization of Work Processes

To conduct their work, the home care personnel needed access to information about planned activities and information about the care recipients. Before starting the night's route, one of the employees took down a binder from a shelf and started to glance through the papers. *"This is the binder where you find all the information about the care recipient."* Another employee explained why they did not use the system instead: "*It takes so long time to log in to the system, so we have printed all the papers instead."* Mobile access to the MS would provide up-to-date information about the care recipients and not information that has been previously printed and potentially changed. In some cases, the home care personnel brought printed documents, that contained private information about the care recipients, with them to the car and to the care recipients' homes. *"We visit some care recipients so often that we know them, but for instance this man we don't help him that often... It's good to have some information*

about how he prefers it." ICT that gives mobile access to the information would reduce the need to print private information on paper and the risk of misplacing that information. In other cases, the personnel did not have access to information about the care recipient when they needed it out in the field. One of the first visits were made to an elderly woman who had fallen badly, her face was covered in blood and she laid on the floor. The personnel asked her about her relatives' phone number but she did not remember it. With the support of ICT, the home care personnel could have had access to the information about the care recipient's health and contact information to relatives.

The work process was in several situations hampered by the need to go back and forth between the office and the care recipients' homes. For instance, the personnel received an alarm from an elderly living in a suburb when they were close to that suburb. Still, they had to go back to the office to access information and to gather the key before it was possible to return to the care recipient. In addition, the personnel were only able to document information and reflections about the performed work activities at the office. Consequently, the personnel spent part of their work time on the road, travelling between care recipients and the office instead of moving between one care recipient to another. Mobile access to the systems would allow the personnel to document information directly after each activity, reducing the need to take notes on paper and travelling back and forth to the office. During the observation, they were asked if it would be an alternative to register information while driving between care recipients' homes. *"The one who isn't driving could register information…if you don't get carsick. But it would probably be easier to describe, directly, how we helped them."* A summary of how ICT can be supportive is presented in Table 1.

Table 1: A summary of how ICT can support information access and rationalization of work processes. Identified during the observation (obser), the workshop (Ws) and in documents (Doc).

Information access	**Obser**	**Ws**	**Doc**
Access to real-time information	x	x	x
No need to print and bring private information outside the office	x	x	
Access to information during the point of care	x	x	x
Rationalization of work processes			
No need to go back to the office to gather information	x	x	
Documentation of information outside the office	x	x	

3. Discussion

In this paper, we have described the workflow of a home care group and identified how ICT can support access to information and rationalization of work processes. The results show a complex process and indicate that the available resources are not used in the best possible way. Today, the home care personnel cannot access information at the point of care or register information when they are outside the office. Information is therefore printed on paper, resulting in information that is possibly not updated and could be misplaced. There is also a risk that valuable information is missing at the point of care and resources are spent on transportation.

ICT could be valuable for the home care service that is delivered by the municipality. With mobile access to information, it seems possible to increase patient safety by reducing the risk of misplacing information about care recipients and at the same time improve support by providing updated information about the care recipients' needs and health at the point of care. This is consistent with previous studies, which

indicate improved information sharing using ICT [11]. The use of ICT cannot itself rationalize the work processes without a changed procedure for managing keys. The implementation of a mobile service, in combination with a changed system for keys could prevent home care personnel to return to the office between alarms. Hence, time and resources could be used more efficiently due to shorter transports and less time spent in the office. As previously shown, point of care documentation, can increase the quality of the information as it does not have to be remembered for longer periods and allows information to be spread directly to colleagues [12].

Today, it is not clear whether it would be possible to register information on a mobile device. Issues like information security, internet access and working environment could outdo time and resource savings. The lack of internet access is a challenge towards an implementation and could also hamper the use of a mobile service in the long run [13]. If the home health personnel experience problems with accessibility at several occasions they might go back to the old work routines. A limitation of our work is that we only studied one home care group and only observed the work performed for one night. The generalizability of the findings is therefore limited. Due to the page limit of the paper we have not discussed potential barriers towards an introduction of ICT, something that needs to be taken into consideration.

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