The eHealth Diary – tailoring a solution for elderly, multimorbid homecare patients

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Abstract. We have designed and developed an eHealth solution for specialized homecare; evaluated the system and increased its functionality during four research studies, with the fourth still ongoing. The system is tailored to suit both elderly, multimorbid patients with low digital literacy, and their professional care providers. Evidence from the first three studies show that acute hospital admissions were avoided and patients could be treated at home since the care providers detected patients' beginning deteriorations via the system.

Keywords. Home care services, hospital-based, telemedicine, digital pen

1. Introduction

The need for telehealth solutions for elderly, severely ill patients with limited interest or ability in learning how to use computers, tablets or smartphones, still exists. When Society is digitized, this group will be left "outside" if we cannot offer alternative technologies and solutions to them. A growing number of elderly people contracting diseases during the later stages of life and cared for in their homes increase the need for tailored telehealth solutions – in both ends, i.e., for the patients and for the care providers.

Through sixteen years of research, comprising four studies, we have designed, developed, evaluated, re-designed, improved and evaluated again, a telehealth solution for use within specialized home healthcare [1-4]. The fourth study – the eHealth Diary – ends in December 2017.

2. Method

In order to understand both patients' and care providers' needs, and setting the requirements for the system, we formed a Requirements & Design Group at the prospect of each study. Considering the patients' low digital literacy, we let them use a digital ink pen for their daily health status reporting in all four studies. This way the patients only had to be able to write with the pen and not use any computer, tablet or smartphone. Patients' reports were automatically sent to the care provider's server when the patient marked a send box on the paper form. The care providers' web-based system for

monitoring incoming patient reports was extensively re-designed and further developed with increased functionality before each study.

3. Results

The system used in our first study had no alarm function, whereas the latest re-designed Health Diary system generates alarms if measurements or symptoms are below/above the individually decided thresholds, if a patient misses reporting, or if the care providers forget to check and sign. Therefore, a larger number of patients can be safely monitored today. A total of 142 elderly homecare patients with advanced illnesses, e.g., cancer, heart failure (HF) and chronic obstructive pulmonary disease (COPD), have participated in our studies. Results from the first three studies showed that digital pen technology is suitable for patients with low digital literacy. Acute hospital admissions were avoided and patients could be treated at home when they deteriorated. Results from the fourth study will be analysed during 2018.

4. Discussion

Although the digital gap is shrinking, the need for telehealth solutions tailored for elderly severely ill patients with low digital literacy will remain for years to come [5]. Telehealth systems should preferably be: a) flexible enough so patients can choose to use technologies suitable for them, and, b) include decision support for safe monitoring of a large number of patients. Next step will be to analyse our results using machine-learning techniques with the purpose of finding parameters pointing at beginning deteriorations, especially for patients with HF and COPD, and thereafter implement these algorithms in the system giving the care providers a more advanced decision support.

5. Conclusion

Evaluations of the Health Diary system show that it is suitable for use within specialized homecare, for the care providers and for their elderly, multimorbid patients with low digital literacy.

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