
Abstract

Background: Coordination of health care processes and active involvement of patients are crucial factors in therapy management of chronic diseases. The vision is that the cooperation between participants in health care processes is enhanced and intensified by computer-based guidance and communications systems as an additional link for an improved, personalised care.

Objectives: Design, development, and clinical evaluation of a telemedicine platform to support integrated and patient-centred care concepts in therapy management of type 1 diabetes mellitus, congestive heart failure, hypertension, and cardiac arrhythmia with indication for pacemaker therapy.

Results: A telemedicine platform that supported patients and health care professionals in therapy management was developed. Patients were provided with mobile phone based telemedicine terminals for data acquisition in daily life and transmission of data to the central telemedicine service centre for further processing. The Web terminal provided the health care professionals access to the data as basis for further decision and/or telemedical interventions.

Clinical evaluation on ten patients with diabetes showed a decreased HbA_{1c} value (HbA_{1c}: pre-study 7.9% ± 1.1% versus post-study 7.5% ± 0.9%; p=0.02). Close monitoring of 24 patients with congestive heart failure or hypertension allowed detection of early signs of patient deterioration that may help to avoid hospital admissions and facilitate appropriate adjustments of antihypertensive medication, respectively. In general, mobile phone based telemedicine terminals were proven feasible and were widely accepted by patients. The developed telemedicine framework for remote pacemaker follow-up provided the health care professional at the point-of-care with an efficient screening method to identify possible malfunction of the pacing system in collaboration with the specialist at the clinic. To ensure data consistency and coherence with existing workflows and processes an interoperability framework was developed that allowed data exchange between the telemedicine platform and the IT infrastructure of the regional hospital group. The system is currently evaluated on 414 patients in the course of a multi-centre, randomised, controlled study. Preliminary results showed technical feasibility and the potential of telemedicine care concepts in pacemaker therapy management. Furthermore, the interoperability framework envisions the integration of the telemedicine platform into the upcoming national eHealth infrastructure.

Conclusion: The adoption of integrated and patient-centred care concepts in chronic disease management can be seen as a catalyst to transform limited resources into effective health outcomes. The ultimate goals to reduce the expenses for the health system and to increase safety, quality, and efficiency seem to be achievable in principle.