CroniCare: Platform for the Design and Implementation of Follow-Up, Control and Self-Management Interventions for Chronic and Multimorbidity Patients Based on Mobile Technologies

Alberto MORENO[a], Jesus MORENO[a], Samuel SALAS[b], Victor GONZÁLEZ[b], Agustín VALIDO[a], Pedro GUARDIA[a], Luis LUQUE[a], Ana REALES[a], Maria MACHUCA[a], Eva MONTBLANC[a], Clara GARCIA[a] and Juan M. DE LA VEGA[a]

[a] *Servicio Andaluz de Salud, Sevilla, Spain*
[b] *FISEVI, Sevilla, Spain*

Abstract

The project proposes to facilitate the design and evaluation of interventions based on mobile technologies and information systems in order to improve the capacity for self-management, empowerment and control of chronic and multimorbidity patients. The system allows to create customizable apps according to the needs of primary care and specialized care. The project includes an evaluation of the impact of the care model, as well as the effectiveness and efficiency of the intervention through a study with 124 multimorbidity patients

Introduction

Chronic diseases are the most common cause of death and disability worldwide [1]. They are diseases of long duration and normally slow in progression. The World Health Organization identifies that heart diseases, heart attacks, cancer, respiratory diseases and diabetes are the main causes of mortality in the world, being responsible for 63% of deaths. Health services remain largely configured to the management of single diseases creating a mismatch between needs and received care provision. Multimorbidity is usually defined as the presence of two or more chronic diseases in one individual and it is increasingly recognised that many people with chronic disease are multimorbid, and that in older people multimorbidity is the norm with significant numbers of over-65s having complex mixes of conditions [2]. Multimorbidity is associated with polypharmacy and a range of undesirable outcomes, including mortality, reduced quality of life and functional status, increased health service use, worse co-ordination and reliability of care, and higher treatment burden. The management of chronic diseases requires establishing a long-term care plan where adherence to treatment is critical to obtain improvements in health outcomes, quality of life and to achieve cost-effective health care.

Methods

Cronicare system seeks to establish mechanisms for an agile and customized development of interventions based on the use of mobile technologies. Representatives from 4 different Primary care centers and 4 hospital departments Internal Medicine, Endocrinology, Neurology and Allergology defined multiple profile of complex patients with multiple healthcare conditions. For each patient profile they defined control measurement, decision support rules, personalised thresholds and patient recommended pathways.

Inclusion Criteria

- Age >18 years
- Heart failure + an additional diagnosis of COPD, Diabetes type 2 or asthma
- Mild severity level according to the Profund Index <= 10 points
- Availability and capability for using an smartphone by the patient or caregiver

Exclusion criteria

- Pregnant women, breastfeeding women or women who want to become pregnant
- Subjects with malignant disease, uncontrolled risk factors
- Significant limitation of their basic activities

Results

This project has developed a mobile app for patients that is able to be configured by healthcare professionals in an environment fully integrated with existing Electronic Health Record system. Figure 1 details the system architecture and the integration of these modules.

Health professional web platform. This system allows the configuration of the proposed mHealth intervention. In this platform, the healthcare professional will be allowed to create the educational content to be displayed in the app, the forms and scales that will be filled out in medical consultation and in the app, as well as the rules associated with the reminders and notifications that the patient will receive through the app.
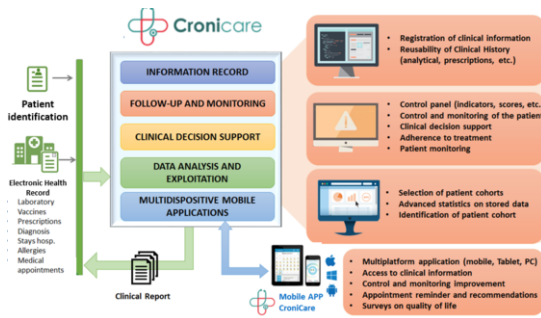
Figure 1– System architecture and functionalities

Mobile application of the patient. This application allows remote patient interaction with the mHealth intervention configured by the healthcare professional. The patient receives notifications and reminders about the activity to be carried out to improve their state of health (control of health habits, adherence to prescribed treatment), also allowing interaction with the system to register scales and specific forms with the intervention carried out.

Integration with existing EHR system

Cronicare has been integrated with the existing Electronic Health Record system based on international standard terminologies for relevant patient information such as Diagnosis (ICD10), laboratory tests (LOINC), prescriptions and dispensations (National Codes).

Figure 2– Mobile app screenshot

Discussion

Multimorbidity is common and it matters because people with multimorbidity have worse mortality rates, quality of life and functional status, because they are the highest and most expensive users of health services, and because they frequently experience uncoordinated and unreliable care, and unsafe polypharmacy significantly driven by a lack of coherence across multiple single-disease guidelines. This project aims to establish a set of profiles addressing for multiple conditions that are commonly presented in our population in order to clarify the management of those patients that require complex decision making. The defined profiles are associated with protocols for patient control that based on the CroniCare mobile app ensure the systematic data collection of patients.

The definition of profiles with the most common combination of chronic diseases aims to develop a scalable framework to manage these patients in our healthcare provider. Cronicare system aims to facilitate the design, implementation and evaluation of new models of care based on mHealth in a way that allows increasing the adherence, control and self-management capacity of chronic patients. Using a highly customizable application to satisfy the needs of the different chronic ailments, it is possible to promote scalability avoiding having to develop applications from scratch for each disease. Cronicare system allows the establishment of an iterative process that allows applying a continuous improvement process in the design, implementation and evaluation of interventions based on mobile technology.

Conclusions

The developed platform and mobile application, has such a degree of flexibility that it allows establishing a cycle of continuous improvement through the design, deployment and evaluation of mHealth interventions, establishing effective and efficient programs for monitoring patients outside the hospital environment. In this way, it is expected to reduce the number of hospital admissions and days of hospitalization, as well as empowering and improving the quality of life of patients. These health outcomes will be the result of an increase in patients' capacity for self-management of their health status, as well as an increase in patient safety and adherence to prescribed treatments.

Acknowledgements

References

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Address for correspondence

Alberto Moreno Conde

E-Mail: albertomorenoconde@gmail.com

Unidad de Innovación, Hospital Universitario Virgen Macarena, Av Dr Fedriani nº 9, 41009, Sevilla, Spain