POSTER ABSTRACT

Co-designing an mHealth app for the collection of patient-reported outcomes in frail patients

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Francisco Pérez-Sádaba[1], Susana Aceituno[1], Fernando Aparicio[2], Carlos Expósito[2], Lorenzo Martínez[2], S. Giménez-Campos[3], Juan Ramón Doménech-Pascual[3], V. Ruiz-Garcia[3], Jorge Garcés-Ferrer[4], Francisco Ródenas-Rigla[4], Laura Arnal[5], Juan-Carlos Perez-Cortes[5], Francisco Pérez-Sádaba[1]

1: Outcomes'10, Spain
2: Nunsys
3: University and Polytechnic La Fe Hospital of Valencia
4: Polibienestar Research Institute -University of Valencia
5: Instituto Tecnológico de Informática (ITI)

Introduction: Smartchronic is a non-profit collaborative Spanish project for developing a platform to improve and optimize the management of chronic patients based on artificial intelligence tools. Smartchronic platform models the frailty states from patients' data from electronic health records to predict and simulate their evolution and associated care pathways. This platform has incorporated a non-invasive, continuous monitoring mobile health application (mHealth app) for patient self-reporting variables. Patient-reported outcomes (PROs) could help enriching the information obtained in routine clinical practice to assess frailty and used for predictive analytics.

Objectives: To design an mHealth app for smartphones for continuous and non-invasive monitoring of chronic patients by collecting relevant variables for frail patients.

Methods: Phase 1 involved a literature review to identify dimensions and variables related to the patient frailty that could be collected with smartphones as PROs or passive sensors. The search strategy focused on frailty-related terms, dimensions and variables, and mHealth terms. Phase 2 involved five healthcare professionals (HCPs; primary care, internal medicine, geriatrics and nursing) and five chronic older patients. HCPs ordered identified dimensions and variables through an ad-hoc questionnaire according to their importance degree for assessing patient frailty in clinical practice. Through phone semi-structured interviews patients identified those dimensions and variables that matter to patients. Phase 3, based on the HCPs' and patients' opinions a mHealth app prototype was designed and the app was developed and integrated to Smartchronic platform. Phase 4, undertook a pilot study with older patients to prove app usability. The study was approved by the Ethical Clinical Research Committee of La FE Hospital-Valencia (Reference 2020-138-1).

Results: In phase 1, following dimensions were identified in the literature review: physical function, mood, health-related quality of life (HRQoL), cognitive function, nutritional status, social function, symptoms and sleep quality. For each dimension, variables and tools (PROs or passive sensors) to collect them were registered. During phase 2, five dimensions were identified by HCPs and patients

as important and feasible to collect: physical function, nutritional status, HRQoL, symptoms and sleep quality. Identified variables were: number of daily steps measured by smartphone-accelerometer (physical function); weight entered by the patient and appetite level determined by a Visual Analogue Scale (VAS) (nutritional status); EQ-5D questionnaire (HRQoL); VAS for pain, fatigue, hearing and sight (symptoms); and quality and hours of sleep measured by a Likert-scale (sleep quality). In phase 3, according to these variables the app was developed. Phase 4 is currently underway.

Conclusions: Involving clinicians and patients is essential in the design and development as recipients of the potential benefits. Our methodology has allowed us to develop an app that easily collects outcomes that matter to patients. This new tool has been integrated into the Smartchronic platform and could support HCPs to assess patient frailty and to improve the care of frail patients.

Limitations: In phases 2 and 5 the small sample of participants may limit the generalization of results, however app usability in more chronic patients is being tested.