A Supporting Platform for Comprehensive Geriatric Assessment and Multi-Modal Tailored Interventions

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Abstract. Frailty condition is an intermediate state in the ageing trajectory, preceding the onset of disability, and is becoming both challenging and priority to guarantee the sustainability of healthcare systems. To address it, we designed a software platform for supporting CGA and monitoring the activities performed at patients' dwelling. We have implemented an alert engine to inform the care professionals of intrinsic capacity decline, and a decision support system for referral recommendations. Besides, the platform enables them to provide tailored interventions to their patients.

Keywords. frailty prevention, CGA, tailored intervention, home monitoring

1. Introduction

By 2050, life expectancy will surpass 90 years and one in six people in the world will be over age 65 (16%) [1]. Thus, elderly-associated conditions, e.g. frailty, and illnesses are becoming a huge challenge to the sustainability of healthcare systems. Integrated Personal Health Systems (IPHS) are suitable to elderly, addressing the healthcare in the patients' dwelling and providing integrated support to healthcare professionals [2].

POSITIVE project (maintaining and imPrOving the intrinSIc capaciTy Involving primary care and caregiVErs), funded by EIT Health, proposes a new organizational model to manage frailty, based on the model proposed by Sánchez et al. [3], but including the active participation of community care professionals. We developed a supporting platform for CGA for care professionals to remotely monitor patient's intrinsic capacity and prevent frailty through tailored intervention. Our system includes a novel ruled-based engine using data collected at patient's dwelling to monitor the worsening of their frailty condition. Additionally, we developed a second rule-based engine to recommend community care professionals when to refer patients to specialized care professionals.

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2. Method and results

Using our solution, care professionals are capable to remotely monitor the intrinsic capacity of patients, provide multi-modal tailored interventions and record relevant clinical results related to frailty. A mobile app and a set of IoT devices [4] are used to collect results of tests used to assess frailty. This data are used by the alert engine to allow professionals to quickly notice the worsening of patients condition. Alerts are based on set of clinical rules defining when a result is reflecting a potential decline. The professionals' app also allows providing intervention which can be both pharmacological, using STOPP/START criteria, and physical, using VIVIFRAIL exercises plan [5]. Finally, the app also enables the care professional recording the main results obtained in medical visits related to frailty. Based on these results, the system provides a rule-based recommendation to support community care professionals deciding when to refer a patient to a specialized care professional. The rules are defined based on clinical criteria that determine when the patient intrinsic capacity is worsening.

The platform has been iteratively co-created and evaluated in collaboration with 20 care professionals. Usability tests state that they found the platform easy-to-use and learn, adapted to their needs, and considering their constraints. In fact, SUS (System Usability Scale test) mean values were 75 and 92.5 for community and specialized care professionals, respectively.

3. Discussion and future work

POSITIVE platform fits adequately with care professionals' mental model, and recommendations/alerts support are well-accepted. We found that our solution must require very little effort to be used and learnt for community care professionals, due to the reduced time used in their medical visits.

In our further steps, our platform will be deployed in a clinical pilot involving 150 users, including care professionals and patients from Spain, Poland and Sweden. Further, our platform will be integrated in currently active Hospital Information Systems to extend its robustness, security and interoperability with HL7-based solutions.

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