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The effect of pharmaceutical services-based *eHealth* intervention on chronic patient health outcomes

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Introduction

Internet is a widely accessible channel with the potential to support the management and follow-up of chronic patients. The relevance of the engagement of patients is increasing and becoming a necessary concern for researchers, clinicians and policy makers. A key component in getting the patient engagement and attention is the proper communication with the health professional. Pharmacists act as a public health official and as a specialist in drugs. At community pharmacy, pharmacist offer pharmaceutical care services: a) the pharmaco-therapeutic follow-up; b) the pharmacovigilance (addressing medicine interactions and correct use); and c) patient education. However, there are barriers that limit this process, like the perception of lack of time and of healthcare management tools. In order to answer these issues, it was designed and implemented an online platform that makes possible exchanging information between the pharmacist and the chronic patient, testing *eHealth*. This web-based platform was adapted to the needs of the medicine user. This study aims to understand the effect of community pharmacy-based interventions on patient health outcomes and evaluate how pharmaceutical care can be supported through an online platform. Furthermore, the patterns of exchange of information between patients and pharmacists were studied.

1. Methods

People with more than 65 years with chronic diseases (e.g. hypertension, diabetes *mellitus* type 1, type 2 and dyslipidemias) were targeted to use the online platform, for interacting with the pharmacist during a period of eight months.

We used an adapted *Dader Method* version, revised according with the "new" pharmaceutical care suited to "new" chronic patients. These patients are required to participate in the therapeutic decision and need to be involved in the process to accept

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their own medicines' management. A web-based platform was designed and implemented using Design Science Research Methodologies (DSRM) for the management of chronic diseases. Both the patient utilization patterns of the platform and the engagement of patients were assessed. This web-based interface was developed and funded by a Foundation for Science and Technology project called ePharmacare. The health outcomes research focused on the medication adherence and lifestyle changes that resulted from the interaction with a pharmacist trained in pharmaceutical care via the platform. This study included an evaluation of the platform usability using both patients and pharmacists usage observations. A mix-method approach was followed to study the use of the online platform supporting pharmaceutical care practice, both in the pharmaco-therapeutic management and in chronic patients' empowerment. In the demonstration phase, the platform was used by chronic patients at a Senior University (SU) and by four pharmacists.

The platform was tested in two settings (following five phases (I, II, III, IV, and V) as represented at Table 1): a) Three community pharmacists - using the platform within a community pharmacy (Pharmacists A); b) One community pharmacist - using the platform within a SU, outside community pharmacy (Pharmacist B).

Table 1. Five phases of the platform use by pharmacists and patients

Phases	Community Pharmacy	Senior University
Phase I	Training of Pharmacists A at IHMT,UNL	Training of Pharmacists B at IHMT, UNL
Phase II	Patient recruitment (Presentation of platform and registration of patients)	Patient recruitment (Presentation of platform and registration of patients)
Phase III	Use of the platform (pharmacist-patient communication and data registration	Use of the platform (pharmacist-patient communication and data registration
Phase IV	Evaluation	Evaluation
Phase V	Interviews and Surveys	Interviews and Surveys

2. Results

Participating patients shared similar clinical and demographic characteristics.

The use of both the personal profile and vital data graphics was an essential key to empower patients with chronic diseases for their health self-management, showing significant increases in user-acceptance, medication adherence and healthy behaviors. Pharmacists A, at *Community pharmacy*, did not clearly understand the aim of process and the need of all the phases. All pharmacists also faced difficulties in recruiting patient, showing limited motivation and making no significant effort to find time to address the service, although they kept the interest in participation. Pharmacist B, at *Senior University,* managed to organize with patients a series of meeting to create confidence and communicated with patients through the platform' messages channel. Pharmacist B also did two screenings, at the begin and the final of the intervention.

These screenings were done to measure patients' health outcomes by comparing the effect of the interaction between pharmacist and patient via the platform.

2.1. Clinical screenings and outcomes

Two clinical screenings, first screening (S1), made at the beginning, and second screening (S2) made at the last month of the study, were performed by Pharmacist B. Results demonstrate that blood pressure systolic (BP/S) and diastolic (BP/D) had a reduction of 7.3% and 17.9%, visceral fat (VF) had a reduction of 1.5% and glycaemia post-prandial (GPP) levels had a reduction of 10.2%. These results demonstrate that there were improvements at health parameters, especially at GPP values.

3. Discussion

eHealth strategies are looking to find easier ways to access and manage valuable health information.

Our research addressed the relationship between pharmacists and patients, and it seems to work at supporting better decisions in the management of chronic diseases, by improving the commitment between patients and pharmacists. All pharmacists worked for over a year at community pharmacy and had experience with patient attendance. This study shows that there is a significant potential of the online platform since it allows a closer follow-up in the treatment of chronic diseases, even if the pharmacist at the pharmacy did not used it properly. They had no clear support from the pharmacy director to use meaningful time to address pharmaceutical care. Research using large multi-center trials is required to reach more evidence about access effectiveness of this type of intervention.

A series of barriers was identified at different phases: i) lack of motivation of pharmacists A and patients; ii) lack of time and organization of pharmacists A; iii) and the knowledge of pharmaceutical care by pharmacists A. One can admit that differences between results of pharmacists A and pharmacist B stemmed from attitude and skills. Pharmacist B has shown to have higher experience in the pharmaceutical practice, being more successful in communicating with patients and having higher availability to provide pharmaceutical care.

The pharmacists A knowledge of pharmaceutical care was not enough, if compared with pharmacist B. The skill of the workforce is a core factor for the quality of healthcare systems. The inclusion of doctors as users of the platform is needed, particularly to allow the fully-integration within the health system, as well as to mitigate eHealth services barriers, to establish the platform as a supporting tool for the management of chronic patient's medicines. The recognition of pharmacist's potential to improve outcomes and medication-therapy management opens opportunities to the next research phase – the collaboration with physicians, i.e., a pharmacist-physician cooperation in the primary care team to extend the capacity of primary care.