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ApiAppS: A Project to Study and Help Practitioners in Recommending mHealth Apps and Devices to Their Patients

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Abstract

The ApiAppS ongoing project aims to provide physicians with a decision support system for the prescription / recommendation of mHealth technologies. We describe the context and the components of the project which includes: 1) a technical part on modelling and implementing the decision support system, and 2) a psychosocial investigation part designed to have a better knowledge of general practitioners (GPs) and patients' expectations, beliefs and practices.

Keywords:

Mobile health, Computer Systems, Health comunication.

Introduction

Mobile Health (mHealth) can play an effective role in various domains affecting individual's health conditions (well-being, prevention, management, monitoring or follow-up of known or suspected pathologies). The use of mHealth (apps or devices) can reduce the number of medical visits, increase convenience for the patient while minimizing healthcare system cost [1]. However, several factors hinder this potential: diversity and plethora of frequently confusing products; relative variability and/or relevance of a solution depending on the context of its use; difficulties in assessing its qualities and added values; multitude of covered areas (health and / or wellbeing); and diversity of users/patients characteristics (clinical and paraclinic data, lifestyle, individual preferences). Furthermore, there is a lack of implementing knowledge of the psycho-social aspects/effects related to the arrival of this new technological third-party in the patient-doctor relationship [2].

As well as medical prescriptions, general practitioners (GPs) have a crucial role to play in ensuring that the use of mHealth can really be at the service of the patient and be properly integrated into his/her follow-up and health management [3]. We believe that it is necessary to move towards a mechanism of technical integration (in practice and patient management software) and human integration (in the physician-patient relationship) of mHealth comparable to the mechanism of a usual medical prescription. In order to achieve this, as it is the case with drugs prescription tools, GPs must have the adequate tools to appreciate (as best as possible): the quality, the indications and contraindications, the possible effects of mHealth apps/devices and their evolution/revision (new market entrant, removal, modification of features). In addition, GPs need to know the possibilities of integrating and analysing the data produced by these mHealth apps/devices and how they can be efficiently used to enrich the relationship with the patient.

Cataloguing mHealth apps and devices is already underway. There are indeed specialized health platforms, which offer such catalogues (for examples: myhealthapps.net, appscript.net, mhealth-quality.eu, medappcare.com). Some technical or conceptual problems still have to be resolved: advanced categorization of apps, rich and standardised medical terms indexing, indications concerning tools complementarity.

Beyond the intrinsic improvements that can be made to these platforms, the key step to guide the choice of an mHealth app/device that meets the patient's needs, is to couple these platforms with one or more information sources which give a detailed level of the medical context. The electronic medical record (EMR) is a valuable source because it contains information rigorously collected, numerous, diversified, semantically rich and medically validated with an individual detail level (concerning the patient). Medical knowledge repositories/databases (clinical practice guidelines, medical drugs characteristics) are other sources to take into account for at least two reasons. First, consulting such repositories reflects the user's particular concern (a medical context) for the accessed information (for example: consulting web pages about asthma or a beta2-mimetic drug expresses a very specific concern). Second, these repositories contain validated knowledge (evidence-based practice recommendations, drugs indications or effects to monitor) that must be taken into account when suggestion of an mHealth app/device consistent with this knowledge is desired (for example: suggest an app for daily steps tracking is consistent with guidelines indicating that regular physical activity is recommended for diabetic persons).

To this date, EMR, medical knowledge databases and platforms cataloguing mHealth apps/devices (mHealth app web store), function in silos without interoperating. mHealth app web

stores operate as standalone applications and are based on rudimentary data to guide the choice of an mHealth app/device, limited to what a user can (and agrees to) fill through a search form. Using EMR and/or medical knowledge databases, GPs do not have access to mHealth apps/devices selected for their relevance in the management of a given patient.

The objective of the ApiAppS project is to identify, explore and, when possible, remove technical and psycho-social obstacles so that GPs can use a system to be of help in the prescription of mHealth apps / devices adapted to their patients.

Methods

The ApiApps project has two fundamental components:

1. **ApiAppS SHS investigations (Social and Human Sciences)**: psycho-social, anthropological, usability studies.
2. **ApiAppS Techno**: implementation of a decision support system and interoperability of the 3 sources of information.

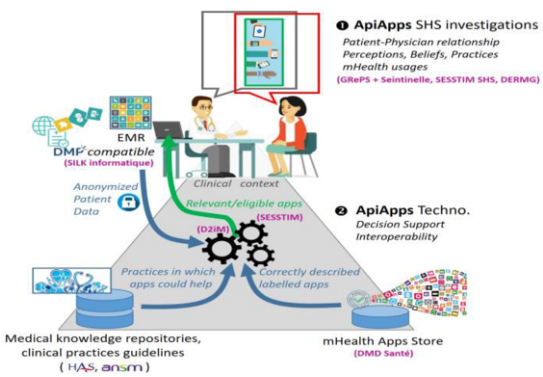

Figure 1 – ApiAppS big picture

ApiAppS implementation will integrate the psychosocial aspects related to the mHealth usage and to their prescription. These aspects are identified and analysed in a dual approach (anthropological and psychosocial), with qualitative and quantitative studies, in order to better document:

- Representations, expectations, beliefs and practices of GPs and patients, related to mHealth apps and devices. Are mHealth apps/devices perceived as tools to enhance personal responsibility (patient empowerment) or is mHealth perceived more as control and standardization tools by health stakeholders and authorities?
- The place of mHealth apps in the doctor-patient relationship [4]: Are they perceived as intrusive, disruptive to the relationship, or conversely, as an element that can reinforce it (or even on a symbolic dimension, the extension of the relationship as for medical drugs)? It will also be questioned whether the prescription itself induces new ethical problems and fears in terms of data security.

ApiAppS project aims to provide a web-service for decision support so that the selection/prescription of a mHealth app/device is adapted to the patient's profile and is relevant to the doctor-patient relationship and the care process. We try to resolve the following technology and information challenges:

1. What kind of information should be available in the electronic medical record, in the knowledge databases, and in mHealth app web stores to allow a basic coupling between these systems? Which data will allow an optimal coupling?
2. What are the coding format(s) and the terminology(ies) adapted to such data?
3. Are the existing interoperability frameworks adaptable to the problem of communication with a store dedicated to mHealth apps/devices?

Results

ApiAppS is a work in progress (from 2018 to 2021). A first qualitative study [5] (semi-directive interviews carried out with 20 GPs) shows there is a gap between mHealth innovation and GPs' everyday practice. GPs perceive mHealth as a potential tool in the relationship with patients but are not familiar with mHealth tools and have doubts and questioning about: How to integrate mHealth into a medical consultation? What place should be given to mHealth in medical follow-up? What to do with the produced data? Is there a risk of isolating patients and/or giving them illusions of safety? Others qualitative and quantitative studies focused on patients' groups are ongoing.

ApiAppS Technological components will lead to the definition and implementation of an interoperability framework in compliance with EMR programs, knowledge databases and mHealth app web stores. First results of the project will be communicated during the poster session.

Conclusions

mHealth is a means to have supplementary options for the patient follow-up or for other aspects in the patient-doctor relationship. This project is in line with: the current evolution of the healthcare mobility; the integration of mHealth apps and devices in care prescription; and the need to better inform practitioners and patients of their relevant/irrelevant use in certain situations. ApiAppS project is a contribution to remove the bottlenecks that constrain rational use of mHealth.

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References

[1] H.E. Payne, C. Lister, J.H. West, and J.M. Bernhardt, Behavioral functionality of mobile apps in health interventions: a systematic review of the literature, *JMIR MHealth UHealth* 3 (2015).

[2] C. Pearce, Computers, Patients, and Doctors—Theoretical and Practical Perspectives. In: Shachak A, Borycki EM, Reis SP, editors, Health Professionals' Education in the Age of Clinical Information Systems, Mobile Computing and Social Networks, Academic Press, 2017, p. 5-22.

[3] F. Lopez Segui, C. Pratdepadua Bufill, N. Abdon Gimenez, J. Martinez Roldan, and F. Garcia Cuyas, The Prescription of Mobile Apps by Primary Care Teams: A Pilot Project in Catalonia, *JMIR MHealth UHealth* 6 (2018), e10701.

[4] A.E. Tozzi, E. Carloni, F. Gesualdo, L. Russo, and M. Raponi, Attitude of families of patients with genetic diseases to use m-health technologies, *Telemed. J. E-Health Off. J. Am. Telemed. Assoc* 21 (2015), 86–89.

[5] L. Auroy, and A. Sarradon-Eck, "The digitally engaged doctor": the discourse and the reality, *SGA-SSE-SSA Annual Congr. Zurich* (2018).