

Mobile Application for Home Healthcare: Physician's Expectations and Perceptions

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Abstract

The aging of the population and the increase in chronic diseases generated the need for care at home for pluripathological patients, who can no longer access outpatient care due to functional and social problems. The use of Electronic Medical Records (EMR) improves continuity of care, simplifies data collection, decreases overhead costs, and reduces mortality in chronically ill patients. The use of an App to check and record data in the EMR during the home visit saves time for professionals and helps to avoid transcription errors. This article shares our experience with the design and implementation of a Mobile Application with EMR functionalities for the Homecare setting of the Hospital Italiano de Buenos Aires network

Keywords:

Homecare, Electronic Medical Record, mHealth

Introduction

During the last decades, the epidemiological transition from infectious diseases to non communicable diseases has been widespread in most countries, not only in high income ones. Nevertheless there is tremendous variation in the burden of disease that is not associated with sociodemographic status [1]. The aging of the population and the increase in chronic diseases generated the need for care at home for pluripathological patients, who can no longer access outpatient care due to functional and social problems. These complex chronic patients (CCP) consume a high percentage of healthcare resources and are at a higher risk of hospital readmissions, adverse events and inappropriate use of procedures [2]. Homecare is an important and effective way of managing chronic illnesses using skilled multidisciplinary team care at home. During the COVID-19 pandemic, some patients avoided or delayed hospital or ambulatory visits, and some got complications due to lack of continuity of care, highlighting the importance of the homecare management. Delayed or avoided medical care might increase morbidity and mortality associated with both chronic and acute health conditions. If care were avoided because of concern about SARS-CoV-2 exposure or if there were closures or limited options for in-person services, providing accessible telehealth or in-home health care could address those needs [3].

Medication availability is also a concern: it could be necessary to adjust dispensing intervals to ensure that supplies are maintained, explore home delivery services, waive dispensing fees, and provide remote consultation support for patients to follow prescribed regimens [4].

Electronic Medical Record platforms provide better continuity of care, simplify data collection, decrease overhead costs, and reduce mortality rates for the chronically ill. For remote consultations via telemedicine or for Homecare, having a longitudinal

record that collects every piece of information is even more important, as different providers can check and update the patient status seamlessly. Unlike hospitals and ambulatory settings, clinicians visit patients at home at different times, independent of each other. The basic EMR functions for Homecare are collection, documentation and retrieval of information, regarding demographic information, lab and imaging results, prescriptions and nursing observations [5]. In a Philadelphia-based homecare agency, clinician EMR use proved to enhance productivity and note completion, as well as timeliness of documentation and billing for reimbursement, with limited impact on improving patient outcomes [6]. Nevertheless, a recent Danish study found that inadequate EMR use is a widespread problem in their long-term care facilities, and the predominant risk for patient safety is incomplete documentation [7].

The use of mobile devices for registering data at the point of care has increased, and different studies have demonstrated its usefulness for physicians, nurses and other healthcare professionals [8]. The use of a handoff system promotes completeness of written information, especially if there are robust interfaces between the EMR and mobile platforms to promote entry of complete and accurate data and to enhance provider workflow [9]. A Spanish study found that the use of an App to check and record data in the EMR during the home visit saves time for professionals and helps to avoid transcription errors [10].

The general objective of the project was to design and implement a mobile application that allows Homecare professionals to have an agile and secure platform to provide access to the relevant information of each patient, allow the registration at home, avoid errors and optimize working time. This article shares our experience with the design and implementation of such Mobile Application with EMR functionalities for the Homecare setting.

Methods

Setting

Hospital Italiano de Buenos Aires (HIBA) is a non-profit organization with a health services network in the Autonomous City and the metropolitan area of Buenos Aires, Argentina. It has 2 tertiary teaching hospitals, 45 outpatient centers and almost 300 associated private practices. It has 750 inpatient beds, 200 of which are for intensive care. Every year, it receives 45,000 inpatients and 3 million outpatient consultations. More than 3,500 patients receive care at home, including 2,900 patients in chronic care and 600 in acute care. Almost 2,200 of them are complex chronic patients (CCP), with an average age of 87 years, a profile of high morbidity and mortality, and high

geographic dispersion. The Homecare section is part of the Internal Medicine Department, and has more than 150 professionals, including physicians, nurses and physiotherapists.

The hospital has developed and upgraded a homegrown information system for the last 20 years. It integrates different administrative and clinical applications, like the Electronic Medical Record (EMR), allowing the paperless operation of all hospital processes. It was certified as level 7 in the EMR adoption model by HIMSS (Healthcare Information and Management Systems Society). The EMR works in different clinical settings (outpatient, inpatient, emergency and Homecare).

From 2016, the HIBA developed a Mobile Application for its healthcare personnel with different functionalities to match their work processes. Recently, an EMR mobile version was included for inpatient management and handoff during shifts. In the Mobile App, the displayed information is an excerpt from the patient desktop EMR, prioritizing those aspects that matter most to hospital physicians during rounds: lab results, fluid balance, assigned tasks, principal diagnosis, medication list, allergies, code status and current clinical condition. Within the app, it is also possible to write clinical notes that are stored in the clinical data repository, avoiding information silos. The Mobile App has also a Beta functionality that allows voice to text input in the clinical notes, using a homegrown speech recognition software [12].

Usually, Homecare professionals see their patients at home and afterwards they write clinical notes, referrals and prescriptions at the hospital or even at their own home, using a desktop PC or laptop. Despite all of them having a smartphone, mobile access to the traditional web based EMR is not easy and some modules are not available. There was a clear need to develop a new version of the Mobile App for Homecare professionals to access their patient EMR.

Materials and Methods

This project was a joint effort between the Homecare section and the Department of Health Informatics. An agile approach with a minimum viable product and continuous iterations allowed to roll out a pilot and quickly detect improvements opportunities. We conducted a mixed method study with qualitative and quantitative research regarding physicians' situations and expectations (pre-implementation) and perceptions (post-implementation). The post-implementation survey was based on a published validated structured questionnaire to measure the quality of experience in mHealth applications [13].

Results

In December 2019, we conducted a survey within Homecare physicians and nurses with the aim of identifying access problems to the EMR in out-of-hospital settings. The survey was anonymous using Google Forms, with 9 structured questions and 2 open to free text answers. The questions included the type of device used, type of connection, internet quality and provider, EMR module with greater access difficulty, among others. We received 32 responses and we confirmed that almost 80% of the respondents had difficulties accessing the EMR on a regular basis. Even though there were some clinicians accessing through their smartphones, around 75% used desktop PCs. Almost 70% of the participants thought that a Mobile App would facilitate the EMR access and ease their workflow. The open questions were referred to the moments when the EMR could not be accessed and the proposed suggestions.

The first phase of the project was to roll out a minimum viable product as a pilot, with basic functionalities similar to the inpatient handoff App. Given the functionalities of the app, it allows

home care doctors to access the EMR of their patients at the point of care to: check other physician notes; check laboratory and imaging results; check their medication list; write clinical notes by free text input and select a coded problem as the main complaint.

The Mobile App was tested and deployed in late October 2020. A screenshot of the Mobile App can be seen in Figure 1. Then, we selected 5 physicians and gave them access to the mobile application.

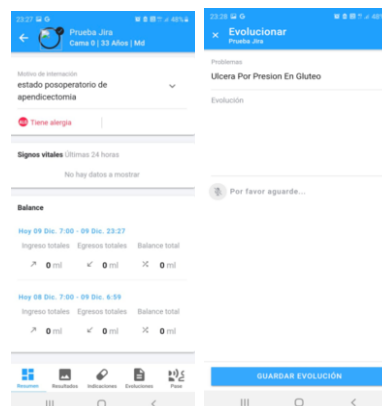


Figure 1– Screenshots of the Mobile App showing different sections (left) that include Summary, Results, Medication List, Clinical Notes and Handoff; Clinical Notes section (right) where a physician can select a main complaint and write a free text note.

We conducted a satisfaction survey among pilot users which preliminary results showed a high engagement with the Mobile App, with 100% of the pilot users accessing to check their patient EMR. Most users agreed that it was easy to learn and easy to use. 60% agreed that the app allowed them to do things that were previously not available. 60% believe that it led to an improvement in workflow. They also highlighted that it allowed easy but secure access to patient information, at the point of care. Some respondents gave feedback on the App design and asked for more functionalities that are being analyzed to prioritize next improvement developments. Proposed improvements include pharmacological and non-pharmacological prescription from the application, request for complementary studies, uploading of photographs to record pressure wounds using the device's camera.

Discussion

Our application is similar to that implemented in the Spanish study, except for the lack of prescription and lab tests request functionality [10].

The need of a mobile App to access the patient EMR at the point of care was highlighted in our initial surveys. After the design, development and testing phases, we implemented a pilot study to try it in a real environment. The first perceptions were very good and prompted the rolling out of the App to all clinicians participating in Homecare, while conducting a wider usability and satisfaction study.

Limitations

Our research was done in a single academic center using in-house developed software and thus might not represent other institutions.

Future Directions

The team is conducting a larger usability and satisfaction study, including a representative sample of homecare physicians.

The Homecare section is also participating in a new trial of efficiency, effectiveness and satisfaction of the speech recognition functionality (voice to text input) within the mobile App, which appears to be very useful for those health professionals seeing patients in out-of-hospital contexts.

Conclusions

The use of a Mobile App to check and record data in the EMR during the Homecare visit had a global positive expectation and perception from physicians from our network.

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