NOPA, Usability testing of an application to help patients during the treatment of infectious, and chronic diseases in Brazil

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Abstract

The amount of applications for mobile technology developed to help nurses, doctors, and patients during the treatment of chronic illnesses can be considered an advance provided by the widespread usage of devices such as mobile phones, smartphones, and tablets. Mobile healthcare, or MHealth, refers to the use of mobile devices in healthcare. Designed for different operational systems and virtual stores, more than 5000 applications options are offered nowadays. A wide range of solutions such as booklets of vaccination and medication control are assisting people in their daily activities and consequently increasing the efficacy of treatment performance. This paper aims to present the usability testing of a mobile application designed to help patients during the treatment of chronic illnesses in Brazil. Advantages and disadvantages related to this service also will be presented.

Keywords: mobile healthcare; usability testing; chronic illnesses; medication adherence

1. Introduction

The long-term use of medicines has already been the main treatment of chronic illnesses. Although these medications are effective in combating diseases, their full benefits are often not realized because approximately 50% of patients do not take their medication as prescribed [1].

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A large number of factors contribute to poor medication adherence: communication barriers between doctors and patients, collateral effects, lack of family support, medication costs, ineffective presentation of the medication by doctors which leads to patients’ lack of involvement in the treatment decision process, memory and attention in patients to control the numbers of pills prescribed by doctors in the same period, etc.

This poor adherence to medication leads to an increase of morbidity and death and is estimated to incur costs of approximately $100 billion per year [1]. That scenario reveals one of the specificities where MHealth can provide strategies to improve patients’ quality of life.

In Brazil, health care information systems are still poor. In general, doctors still create barriers because they do not believe in the real efficiency of such systems and how they can reduce or solve small daily problems like clarifying doubts or reinforcing important information.

This paper aims to present the description of NOPA application’s usability testing, performed in Manaus for one month with 10 participants. All of users were people in treatment against Human Immunodeficiency virus, HIV. They have taken among 2 and 5 types of medicines daily, at about 4 different hours.

2. Mains definitions

All Mobile healthcare, or MHealth, refers to the use of mobile devices in healthcare. Technology used to enable m-health solutions include mobile networks, mobile messaging services, software applications installed in remote data centres, mobile apps, devices and sensors [2].

There are two main classes of healthcare information systems: administrative and clinical. An administrative application refers to a system that must manage functions and operations of the healthcare organization. A clinical application refers to a system used by providers in diagnosing, treating, and monitoring a patient [3]. Because it aims to allow individual medication managing by the patient and monitoring the medication adherence by the doctor, NOPA can be classified as a clinical application.

Although there is a good side to mobile healthcare services, some aspects of such systems must be developed thoroughly regarding the sensibility of medical history, information privacy and data control. For patients with chronic, and infectious diseases individual seeking and privacy are essential. A chronic disease is a long-lasting condition that can be controlled but not cured [4]; Infectious disease is defined as an illness caused by a specific infectious agent or its toxic product that results from transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector or inanimate environment [5]. Both, chronic and infectious diseases include care and a long-term treatment.

Some examples of chronic diseases are: Allergies, Alzheimer's Disease Caregivers, Breast Cancer, Diabetes, Epilepsy, Glaucoma, Heart Diseases, Obesity, and Being Overweight.

Some examples of infectious diseases are: HIV, Tuberculosis, Malaria, and Polio.

2.1 MHealth advantages

Patients can create and maintain comprehensive online accounts via their mobile devices; the mobile devices provide the capability to easily update and manage personal systems at any time, and from any location; easy and convenient to use for wellness and health monitoring [3].

2.2 MHealth disadvantages

If the device is lost and the health data is stored on the mobile device, there could be serious security implications for the patient; the screen for the mobile device may not display all the information clearly due to the size and those users who are not used to mobile displays may find it difficult to understand them [3]; In Brazil people older than 50 have resistance to smartphone usage [6] mainly because they have difficulty to interact with apps, menus and icons available on graphic interfaces.
3. Application NOPA

NOPA is an application created to help people during the treatment of chronic diseases via mobile devices. Through this application individual medications and treatments can be registered by the doctor in an information system and then accessed at any time, everywhere, via smartphones or desktops. On the other hand patients can create groups for sending and receiving messages, asking for information about medication, receiving tips about how to reduce collateral effects, and they can also stimulate their treatment adherence through participatory communication, see Fig. 1a.

It was possible for each participant of the group to visualize his own medications individually, see Fig. 1b. A moderator can access all group messages so as to administer inappropriate content. For preserving privacy two features were implemented: the first one permits the user to rename the app according to their preference. It was observed that some of them hide their health status from family and friends. So this option allowed them to propose a name not to draw attention to themselves; the second feature blocks access to the app without the correct password inserted, see Fig. 1c.

![Fig. 1. (a) first picture; (b) second picture, (c) third picture.](image)

4. Methodology

- Qualitative study conducted in December 2013, divided into three rounds, based on daily usage tracking.
- Each participant was stimulated to share and receive messages, send and confirm the treatment through the application NOPA during one month.
- The experiment was conducted in non-controlled environment.
- Sample of 10 external participants using 10 devices - Nokia C2-06.
- Both genders, 26-68 years old - People who are in long-term treatment of disease, HIV.
- All the participants accessed the internet on their mobile phones every day. 3 of them had more than one mobile phone.
- SMS and Social Networks, like Facebook, were the most used services in their mobile phones.
- During the recruitment of participants, when asked what factors affect the medical adherence they mentioned that the lack of memory caused by the reaction to medicines or diseases caused by HIV are the main obstacles to adhesion treatment.
- Aiming to establish a relationship of trust and loyalty between researchers and the participants it was important to participate of two encounters with the people selected before starting the field research.
4.1 Round 1, Findings

A Focus group was conducted during the devices delivery to verify the initial perception about the application.

All the participants thought was difficult to send and find messages. They sometimes tried to access the messages through ‘my group screen’, sometimes they tried through ‘my messages’, and sometimes they searched into the inbox of the mobile device.

Some participants received the alert about their treatment during the focus group. It made the initial experience of usage very positive.

It was observed that the status ‘online/offline’ of members of the group was not perceived from the most part of the participants.

4.2 Round 2, Findings

Phone interviews, per participant, were conducted after the first week of usage to check doubts and expectations. The findings were:

- 4 participants said that the alert was not working correctly. According to them, sometimes the alert sound did not ring at the scheduled time; sometimes it stopped and did not work anymore.
- The splash app icon arranged on the first screen of the mobile device was deleted for 4 participants. They commented that the icon disappeared and they did not know how to use the app again.
- Two participants said that the application was working very well.
- Although some participants were in trouble with the alert after five days of usage, the level of acceptance of the application was unanimity for all the participants.

4.3 Round 3, Findings

A Focus group was conducted at the end of the evaluation. A Satisfaction scale from very difficult to very easy was applied to measure the impression of each participant about the features.

After using the application, all the participants considered that application something essential. Some of them, asked when the final version of the app will be available to use, because they want to recommend it to their friends.

The low vision is a common problem in patients with HIV and in patients with other chronic diseases, that condition must be considered. Some participants commented that the font size is too small. The font size should be a customizable option, according to the limits of each patient.

The most part of participants expressed that they would like to know the online status to each member of the group easily. According to them, a sign/icon, similar to MSN Messenger, could be provided to indicate it. It was observed that the application became a way to facilitate the communication with people who were living the similar situation. According to them if they know that a friend is online they can clarify doubts easier.

The alert sound did not work as expected. Some participants said that after three/five days of usage the alert stopped and they felt ‘lonely’, because the application was a kind of ‘friend’ that helped them with the treatment.

Those statements were important to propose a battery status message aligned to the app as a way to prevent the mobile turn off unexpectedly. That problem was evaluated as a critical problem and was it was recommend to be immediately solved.

Two participants had health problems during the evaluation and they asked to leave the research. One participant had the mobile phone stolen during the evaluation.

The participants were asked to comment about what they like/dislike most: the continuous feedback alerting about the time to take their medicines, and the password request to access, were the positive points; the font size, the performance to send messages, the status online/offline - was not easy to identify, and the lack of a feature to notify when a member of the group is online were the negative points mentioned by them.

Access the application, Find/visualize the time for medication, and Turn off the alarm to confirm that the medicine was taken were the best rated features. The users said:
“It is very easy to see the schedule of medications, it makes it easier to take medicines.” (male, 41 years old)  
“The letters are too small, for those with vision issues, it is a little difficult, but overall it is easy.” (male, 68 years old)  
“Access the application was easy. The shortcut and the font size helped me during the initial visualization.” (male, 26 years old)  
“It has a password to access, I really like it! Sometimes other people use our mobile phone, and we don’t like to show that we are taking those medicines.” (female, 42 years old)  
“It is simple to access. It requests a password to access. It makes me sure that nobody will access my application.” (male, 47 years old)  
“The procedure is very practical because it looks like an alarm clock, but it is even better because it doesn’t play the sound for a long while to confirm that you have not taken the medication.”(male, 26 years old)  
“It is like a mother: Boy, go take your medicine! Go on!’” (female, 42 years old)  

Send a message to the group, and send a direct message were the worst rated features. About it the users mentioned:  
“I could not send messages to the group. I tried many times and at different times.” (male, 41 years old)  
“The point is that I was not sure if the message had been delivered to the person.”(male, 26 years old)  
“Send a direct message is easy to find, but I faced the same problem when I tried to send messages to the group, I did not know if they had been sent or not.” (male, 26 years old)  

5. Final thoughts  

Chronic of Infectious diseases have a stigma. The society models a barrier, a pattern about how patient appears, acts, and feels. During each encounter with the participants it was very difficult to have a neutral behaviour because of the sensibility of the routine/facts reports related to them. How they hide their health status, they live in a kind of vow of silence. They spoke about deceptions, constraints and life expectations during each encounter of the field research. It was very difficult for the researchers don’t be affected emotionally during, and after each interview.  

Patients’ quality of life is not an individual responsibility: doctor, nurses, patients and caregivers can contribute to explain all the benefits of medication adherence. The key component of any good result is patient education.  

References  