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Mobile Application for Pregnant Women: What Do Mothers Say?

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Abstract

Today, health information technologies are constantly expanding and changing, allowing more and more people to use different mobile applications to receive information and control their health condition. Based on the need to implement an application for pregnant women in the Personal Health Record (PHR) of Hospital Italiano de Buenos Aires (HIBA), an Australian survey was carried out to measure the use and utility of a pregnancy application (pregnancy app). Our results were broadly in agreement with the reference values. The survey was distributed through social networks (Facebook and Twitter) during September 2016. We obtained 235 responses from Spanish-speaking women, mostly Argentinian. In conclusion, it could be observed that a pregnancy app offers the possibility of a greater follow-up and provides reassurance to the pregnant women who use it.

Keywords:
Mobile Applications; Pregnancy; Health Records, Personal.

Introduction

Pregnancy is a period in life in which women must get used to a new state and begin to deal with new uncertainties and anxieties. The Internet allows pregnant women to access online discussion sites in order to obtain information about conception, pregnancy and maternity and facilitate communication with other women who are going through the same condition [1]. In this period patients have a great need to look for information. Prenatal education and access to information at this stage is highly valued by women, moreover when it is provided in optimal circumstances and from a safe source [2]. The popularity of pregnancy-related applications could indicate a change towards the empowerment of the patient concerning the provision of maternity care. The traditional model of "shared maternity care" in its functioning needs to incorporate electronic devices. The dependence of healthcare professionals can be reduced by the availability of interactive and personalized information delivered through an application [3].

The most important aspect an application for pregnant women must consider is meeting user needs and being reliable. There is concern regarding the poor quality of many of these applications, since they are not always based on scientific knowledge when providing information or services. Healthcare professionals need to control the quality of information provided by pregnancy applications and identify the needs of women during the prenatal period. Taking this into account we decided to implement in HIBA an application targeted to pregnant women within the Personal Health Record (PHR). The PHR of HIBA is a web-based tool where patients can take an active role in their care, have access to their own health information and also perform certain tasks such as communicating with physicians and asking for an appointment..

In order to inquire about what pregnant women are looking for, we took and translated an Australian survey [1] that had been conducted on the use and utility of a mobile application for pregnancy with the aim of carrying it out in our context. Survey results were analyzed and taken into account for the development of an application for pregnant women within our personal health record.

Setting

Hospital Italiano de Buenos Aires is a tertiary level institution with 150 years of history. It is an academic hospital that covers the entire spectrum of health care: outpatient and inpatient care, emergencies, medical and surgical specialties, critical care, as well as home and chronic disease care. Its informatic development has been achieved from its own initiatives, which led to the appearance of multiple platforms, vocabularies and mechanisms of communication. For more than five years, the institution has been designing and building his own Hospital Information System (HIS) with the objective of linking the great diversity and variety of developments that have been developed over time within the hospital; both in the administrative and clinical layers. This resulted in the incorporation of a greater number of users who currently involve administrative staff, doctors and nurses.

During 2007 the hospital developed the Personal Health Record, a web-based tool that consists on a personal medical record that provides services and access to unified data in multiple applications. It allows patients treated in HIBA health network to interact or consult their clinical or administrative information. Self management and control of its evolution are patient' objectives. The new PHR not only satisfies these needs, but also enables fluid and instantaneous communication with healthcare professionals. To do this, it takes advantage of the possibilities offered by the current technology and the user's new means of communication.

Materials and Methods

So as to get to know the use and utility of mobile applications for pregnancy and parenting, an Australian survey [1] was employed. The translated survey consisted of 14 questions on mobile applications for pregnancy, the name and type of application was not asked (we excluded questions about parenting as they were not part of our goal). The survey was distributed through social networks (Facebook and Twitter) and at waiting rooms of the HIBA Women's Center during September 2016. 235 responses were obtained.

The survey had the following domains:

1. Demographic data (age, country, education level, etc.)
2. Use of mobile applications for pregnancy
3. Usefulness of mobile applications for pregnancy

Table 1 - Demographics (n=235)

Age	Country	City	Education Level
18-24: 13	Argentina: 229	CABA: 84	Middle School: 2
25-30: 63	Colombia: 1	Buenos Aires: 132	High School: 44
31-34: 69	Mexico: 1	Interior: 13	Technical: 38
35-40: 70	Costa Rica: 1	Other: 6	Incomplete degree: 55
41-45: 16	Uruguay: 1		Complete degree: 56
>45: 4	Spain: 1		Postgraduate: 28
	France: 1		Associate Degree: 12

Results

83.4% of women were pregnant at the time of responding the survey. Of the 235 responses, only 152 (64.7%) women had ever used a mobile application for pregnancy and 40.1% used it frequently. Regarding the utility, 92.1% answered that they had found useful functionalities in the application they used. As a striking fact 64.5% did not check the application information sources and almost 72% did not care if the application used their given personal information.

Table 2 - Reasons for using a mobile app (respondents could select more than one option) (n = 152)

Reasons for use	%
Information on fetal development	90.1% (137)
Information about body changes	63.2% (96)
Weight gain control	15.8% (24)
Maternity forums	23.7% (36)
Reminders of shifts and medication	9.2% (14)
Keeping a pregnancy journal	23% (35)
Upload and save studies	1.3% (2)
Upload and save photos	12.5% (19)
Other	9.2% (14)

Table 2 shows the reasons that motivate respondents to use a mobile pregnancy app. The most popular reason for using a pregnancy app was to receive information on fetal development (90.1%). Information on changes in a woman's body during gestation (63.2%) was another frequent reason for its use. This is consistent with the results reported in Australia (86% and 71% respectively). The remaining reasons included control of weight gain (15.8%), discussion forums with other pregnant women (23.7%), reminders of medical shifts (9.2%), keeping a pregnancy diary (23%) and upload of pictures or ultrasound studies (1.3%). In the category "other" (9.2%) we found the functionality of the contraction counter as a reason for its use. As shown in Table 3, respondents found useful information (84.9%) that allowed them to monitor fetal development (57.9%) or changes in their body (39.5%) as well as providing reassurance (28.3%). Also they used it to get in touch with other pregnant women (13.8%) and to store photos and videos (13.2%). Among the less useful features were the appointment reminders (7.2%), the sharing of information with family and friends (6.6%) and the storage of ultrasounds (0%).

Table 3 - Usefulness found in a mobile pregnancy app (respondents could select more than one option) (n = 152)

Usefulness	%
Provides Information	84.9% (129)
Allows monitoring of fetal development	57.9% (88)
Allows monitoring of body changes	39.5% (60)
Provides reassurance	28.3% (43)
Allows communication with other pregnant women	13.8% (23)
Avoids forgetting shifts and medical details	7.2% (11)
Allows storage of photos and videos	13.2% (20)
Allows storage of ultrasounds	0% (0)
No useful functionalities are found	3% (2)
Other	3.9% (6)

Discussion

Several studies have shown that pregnant women are using the Internet to look for information related to pregnancy, and that online forums are spaces they use for support and guidance. Researchers are exploring how new technologies, including internet forums, websites, email, YouTube, text messaging and smartphones, can be used to promote maternal and newborn health. Research suggest that these technologies are a new and promising mean for health education and communication [5]. Mobile applications allow patients to record the health information collected at each appointment and track their health. As patients interact with this information, they may become more involved in their care. Thus, patients believe that their role as patients is important, that they have the confidence and knowledge to take action, and that they can adopt behaviors to maintain and improve their health; patients can be able to take actions, ask questions to their healthcare provider, and participate in the decision making process about their treatment, being therefore partners with their provider in their health care. Patient engagement is a factor that affects the interpersonal processes of prenatal care. Interpersonal care processes conceptually and operationally cover three dimensions of clinical care: communication, patient focus on decision making, and interpersonal communication style [6]. With this in mind, we focus on this population to meet their information needs. For the development of the mobile application for pregnant women within the Personal Health Record we first investigated other experiences on the use of mobile applications. Once we found the survey conducted in Australia, and realize that it followed our same research goal, we decided to adapt it locally and apply it in our context in order to draw conclusions and using it as a guidance for the development of the application's functionalities. We do not find similar experiences regarding this issue in South America, this suggests that although it is demonstrated that mobile applications bring information to the pregnant women and empower them, there is currently lack of evidence and research on this topic in our population.

Regarding the conduction of the survey, social networks employment broadly facilitated survey diffusion. The respondents participation was voluntary and demographic characteristics were heterogenous, which gave us varied and rich opinions. In parallel we conducted the survey in person at the waiting area of the Women's Center of the Hospital Italiano de Buenos Aires. A total of 235 responses were received; 15% of surveys were conducted in person. Results showed a wide range of app use, from those who have never utilized an application to those who use it every day. Other relevant information such as the importance they gave to the source of information they were consulting, or if they were concerned about the sensitive personal information storage and management within the application was also obtained.

Developing an application according to the needs of the end user is extremely important [7]. Pregnancy is a unique life experience that evokes a range of emotions from great joy and anticipation to paralyzing anxiety. This increase on emotions facilitates a greater demand of experience exchange with others as well as instant connectivity, professional consultation and reassurance needs. The panacea to enjoy and relief from these emotions could be the smartphone and its associated applications. These devices could potentially allow women to communicate, follow the progress of their pregnancy, and relieve distress interactively [3]. Informational applications, which are non-interactive and are in the base of reference, constitute the largest category of applications related to pregnancy. These applications cover a range of topics related to maternal and fetal health, from general pregnancy to more specific information, such as the mother's diet for gestational diabetes. In many ways, their quantity and popularity suggest that there is a significant demand for such information [4]. From this perspective, this study was very significant as its identified the patterns of use and the need of applications in pregnant women, as well as clarifying other aspects that should also be taken into account. This resulting considerations were taken as the basis for the development of a specific application adapted to the needs of women in this condition.

The objective is that pregnant woman can find a tool tailor-designed for her that provides with pertinent information, to carry out a collaborative accompaniment of the healthcare team from the moment of conception through pregnancy period and till childbirth; and provide useful tools that allow users to record moments that they consider as important in a "pregnancy journal." This application will be linked to our PHR created as a tool to empower patients and give them the capability to participate in their own health care.

The access to the application within the same PHR gives the patient the reliability that the offered health contents are created and validated by specialized professionals and endorsed by our institution. The application will be called *Personal Portal for Pregnant Women*. Its will contain three time lines differentiated by color, with different types of content: clinical (appointments with professionals, medication to be taken), contextual information (development of the baby according to gestational age, changes in the mother and studies to be done in each trimester) and information added by the patient (notes, reminders, photos). The pregnant woman can monitor her pregnancy through the platform, in real time. (*Figures 1, 2 and 3*). This project, not implemented yet, it is in the last phase of development. Once fully implemented, we will measure its impact as a future line of research.

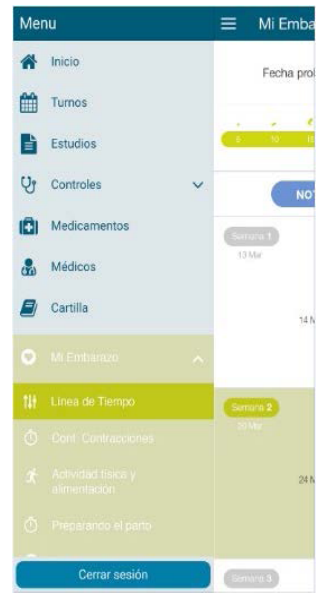

Figure 1 - Screenshot of the mobile version prototype of the homepage menu

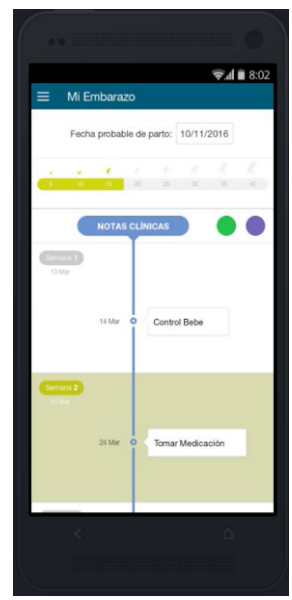

Figure 2 - Screenshot of the mobile version prototype

Figure 3 - Screenshot of the mobile version prototype of the blue timeline (clinical data)

Conclusions

The survey used allowed us to get to know the reasons why women use a mobile application during pregnancy. Although we already had information related to the Australian population, we wanted to characterize the population in our geographical area. In conclusion, we could observe that the pregnant women motivations for the use of a mobile application during pregnancy are highly concordant with those described in the reference paper [1]. This allowed us to define the functionalities to develop a mobile application for pregnant women within the HIBA PHR.

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