

Information technology in prenatal and childbirth care

Gustavo de Araújo Porto Landsberg

MD MSc. Family and Community Doctor. Master in Primary Health Care by Universidade Autónoma de Barcelona. (Autonomous University of Barcelona). Medical Director / Co-founder of Canguru System.

INTRODUCTION

Brazil has a context of high maternal mortality rate and it was not able to reach the millennium target agreed by the World Health Organization (WHO) for this indicator. Studies show that this was partly due to the excessive number of cesarean sections practiced in the country. The WHO recommends that until 15% of births occur by caesarean section, but the Brazilian rate is 54%. In private hospitals, the average is 84%. However, early prenatal care, almost 70% of women want normal birth.¹⁻³

Brazil also registers a high rate of premature births, more than 12% of all children born prematurely. Experts warn that elective caesarean sections performed without medical indication and before the beginning of labor contribute to this situation.⁴

Thus, new tools and actions are necessary to qualify attention to prenatal care and normal birth, taking into account the perspective of the pregnant and handing her relevant and reliable information, which fosters their empowerment. It is already under way in Brazil a large project in order to identify innovative and sustainable care models, that value normal birth and reduce the percentage of unnecessary cesareans.⁵

CANGURU SYSTEM

The *Canguru* is a technological platform for pregnancy care with interface for pregnant women, professionals

and health managers. It was developed with the following objectives:

- to promote a prenatal care and normal birth of quality;
- to identify early high-risk pregnant women;
- to increase interaction among pregnant women, professionals and hospitals;
- to deliver realtime strategic indicators for health managers.

Previously to the beginning of technological development, it was conducted a survey of 6 months duration involving interviews with pregnant women, doulas and activists of humanized childbirth, as well as doctors, nurses and health managers of the public and private sectors - in order to learn deeply the problem and design an application that was aligned with the care processes and to pregnant and professional needs.

As a result of the research, drew up the *Canguru* Prenatal application, which represents the interface for pregnant women. It is available free of charge for Android and iOS since July 2014 and it has the following features:

- **agenda pregnant:** in this feature are presented and organized all the procedures indicated during the prenatal period. The pregnant woman find in this section information regarding consultations, laboratory tests, ultrasounds, vaccines and drugs recommended by the Ministry of Health. In addition to presenting informative content regarding each procedure, the tool allows scheduling and generates notifications and reminders by e-mail with the purpose to remind the user of its activities and increase the adherence to prenatal care;

- **community:** consists of open discussion forums where the user can interact with other pregnant women and health professionals, sharing experiences or asking questions. The forums are moderated by a doctor and an obstetrics nurse;
- **childbirth plan:** functionality that assists in the development and documentation of the childbirth plan, in which the pregnant woman records her preferences regarding the type of birth, performance of episiotomy, accompanying presence, need for special facilities and others. It is possible to generate a document to be shared with the professional assistant or the reference hospital;
- **risk assessment:** This is a questionnaire with forty questions for evaluation of pregnancy risk. The definition of *Canguru* considers criteria of the Ministry of Health, Febrasgo and NICE / NHS (England). According to the responses, users may initially be classified into three levels: (1) usual risk, (2) warning signs and (3) high risk. An owner algorithm called Dynamic Risk Assessment® considers changes reported by patients in real time and uses the data to perform a dynamic analysis of the risk. Thus, a pregnant woman previously classified as low risk can be reclassified in a given function of symptom or clinical condition presented in the prenatal course;
- **guide of symptoms:** in this section are available information regarding the symptoms most commonly seen in pregnancy. For each of them, there is a structured information text into three parts: (1) the symptom explanation, (2) how to avoid tips and (3) concern situations where it is recommended to seek medical care.

All content presented in *Canguru* Prenatal is based on the latest protocols of attention to prenatal from the Ministry of Health of Brazil and the National Institute of Health, UK.

THE PROFILE OF USERS

The *Canguru* Prenatal application met in 18 months, more than 32,000 pregnant women in some 100 countries. Brazil has approximately 95% of them, followed by the United States (0.9%), Portugal (0.8%) and Angola (0.6%).

Among the application users in Brazil, more than half is in the Southeast. However, it was observed accesses from all states of the country. The state of São Paulo has the largest number of users (27.6% of total), followed by Rio de Janeiro (16.7%) and Minas Gerais (10.2%). It was detected

users of the application in 887 cities, totalling 15.9% of Brazilian municipalities.

The average age of the users is 27.4 years old. The average adherence to prenatal reported by users was 11% – considering all the tests, ultrasound scans, consultations, medicines and vaccinations recommended by the protocol of the Ministry of Health of Brazil.

Regarding the presence of risk factors or warning signs during pregnancy, it was observed - after analysis of 470,440 data entries – that 43.5% of them had prenatal of usual risk. In 27.4% of cases was reported a warning signal and 29% of them could be characterized as prenatal of high risk. The most common risk factors observed among high-risk pregnant women were: bleeding in previous pregnancy and Body Mass Index (IMC) superior than 30 before becoming pregnant.

The functionality Communities, launched in January 2014, is moderate regularly by a obstetrics nurse and a family and community doctor who work voluntarily responding to questions and monitoring comments. The users created during the period of one year, 1,119 discussion forums with a total of 3,652 comments.

Since the *Canguru* Prenatal was made available, there were 268,077 application access sessions and 1,489,459 screen views, with an average of 5.5 viewed screens in each session. The average time spent per session was 2.4 minutes.

Regarding the device's operating system that originated the session, the observed frequency was 58.48% of Android devices and 41.52% of iOS devices. The devices that most commonly accessed the system were the Apple brand (41.5%), Samsung (29.1%) and Motorola (17.7%).



Figure 1 - Home Screen.

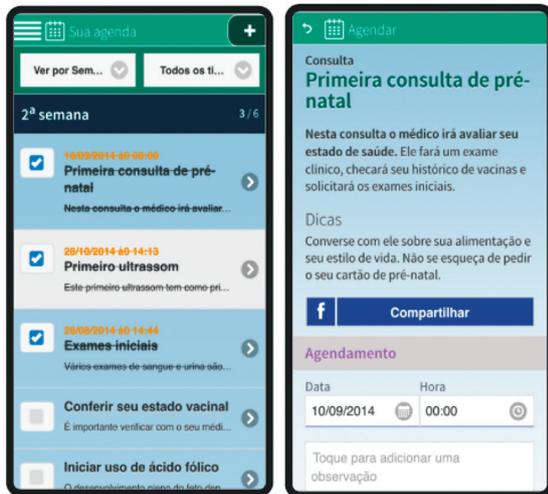


Figure 2 - Agenda.

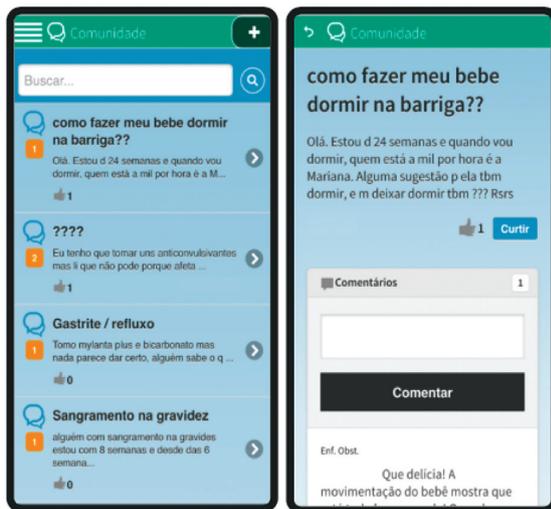


Figure 3 - Communities.



Figure 4 - Symptoms.

PERSPECTIVES

Two other systems were developed concurrently with the *Canguru Prenatal*: the *Canguru Pro*, for professionals of prenatal care, and the *Canguru Manager*, destined to managers in the public sector or in health insurance. Both applications consume real data currently generated by *Canguru Prenatal* application.

In *Canguru Pro*, when duly authorized by the pregnant woman, doctor or nurse can access data from her pregnancy in real time. In this way, the professional can know information about procedures and tests made, risk factors present, reported symptoms and questions presented, among others. Through the system, the professional can communicate with the pregnant woman to remove doubts or recommend a visit to the clinic or hospital if necessary.

The *Canguru Manager* allows health managers to identify and monitor pregnant women in their municipality or health insurance, having access to real time indicators and relevant data for strategic decision making. The system enables the prediction of potential cases for complications and through different communication tools, enables the targeting of awareness and prevention actions.

The Pro and Manager versions are still in the testing phase and they are expected to be available in the market in 2016.

REFERENCES

1. World Health Organization. Trends in maternal mortality: 1990 to 2013. Estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division. Geneva: WHO; 2014. [Cited 2016 Jan 21]. Available from: http://apps.who.int/iris/bitstream/10665/112682/2/9789241507226_eng.pdf?ua=1
2. DATASUS [Internet]. Brasília (DF): Ministério da Saúde; 2016. [Citado 2016 jan. 21]. Disponível em: <http://datasus.gov.br>
3. Domingues RMSM, Dias MAB, Pereira MN, Torres JA, D'Orsi E, Pereira APE, et al. Processo de decisão pelo tipo de parto no Brasil: da preferência inicial das mulheres à via de parto final. *Cad Saúde Pública*. 2014; 30(Supl.): S101-S116.
4. Lansky S, Friche AAL, Silva AAM, Campos D, Bittencourt SDA, Carvalho ML, et al. Pesquisa Nascer no Brasil: perfil da mortalidade neonatal e avaliação da assistência à gestante e ao recém-nascido. *Cad Saúde Pública*. 2014; 30(Supl.): S192-S207.
5. Agência Nacional de Saúde Suplementar [Internet]. Rio de Janeiro (RJ): Agência Nacional de Saúde Suplementar; 2016. [Citado 2016 jan. 21]. Disponível em: <http://www.ans.gov.br/prestadores/projeto-parto-adequado#sthash.r7VnJ210.dpuf>