Development of a Mobile Application for Blood Donation Management

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Abstract

The creation of an application that deals with blood donation in order to facilitate knowledge about the act to its users, whether they are donors or not. Although the blood donation rate in Brazil is stable, there is always a search for ways to increase this incentive for donors to stay at or improve this level. Through a qualitative research, it was determined a knowledge of possible donors, their characteristics and limitations to donate and the benefits presented to both, the patient and the donor. The prototype presents the registration screen, information about benefits and general information about updating the registration, scheduling possible donations and how the process works. It has been found that most people have a certain fear about donating blood, as they are unaware of how the process works, and are supposed to cause some kind of harm to their body.

Keywords: Application creation; blood donation; prototype;

1. Introduction

Blood donation has become a sympathetic gesture, in which a voluntary donor has his blood collected for storage in a blood center or blood bank for use in transfusions, transplants and major surgeries, and is of

utmost importance to treat injured in disaster or emergency situations. However, the issue is still a major problem of worldwide concern, as despite the fact that there are so many scientific and technological advances, there is still no substitute for blood tissue, and the lack of blood supply in a hospital can lead to several problems, such as cancellation of surgeries and other procedures and even the patient does not resist treatment. "World statistics show that blood donations do not keep up with increased transfusions"(Rodrigues and Reibnitz, 2011, p.385).

According to Ventura (2019) the Ministry of Health shows that 66% of donations in Brazil occur spontaneously and the percentage of donors is 1.6% and is within the parameters recommended by the World Health Organization, which recommends that 1% to 3% of the population of each country is a donor. In recent years, the rate of blood donation in the country has been stable, which indicates awareness on the part of the population, but still, a greater incentive and strengthening of actions that can stimulate voluntary donations, always maintaining the maintenance in blood stocks.

The process is given by the identification of the individual, along with the presentation of all requirements and impediments, definitive or temporary, it is of utmost importance that the donor be sincere in their answers, to facilitate the process of their registration. There is a planning, evaluation of strategies and good practices that attract donors, showing the benefits acquired in their donation, how the process is done and how important it is for those who need and ensure their loyalty.

Elected as the main issue for this review: The greatest incentive for the Brazilian population about blood donation, clarifying the importance of becoming a voluntary donor, not only when a family member or acquaintance needs it and what benefits it will bring. Thus, the goal will be the creation of a blood donation application, where the person will perform a registration on the platform and reserve a day for their donation in the hospital responsible acquiring the benefits provided by law in each donation made, may have access to some information regarding what will be done with your donation, where it will be delivered and how it may become more frequent.

2. Methodology and Materials

Qualitative research will be conducted through questionnaires containing 10 questions applied to random adults, from different professions and without tattoos, being the same applied in free digital platforms (Google Forms) and in person. A proposal for mobile blood donation application will be developed to quantify frequent donors and those who donate infrequently or are in the process of making a donation.

For this proposal of mobile application will be used Android Studio, developing in Java programming language, compiled for Android version 7.1.1 and later, accompanied by a resolution 480x854mdpi.

3. Study Development

3.1 Theoretical Framework

This topic presents the theoretical aspects that approach the whole study, emphasizing the questions that make up about blood donation, the knowledge of the restricted public that was questioned and its limitations. At the end, the prototype model with its hypotheses to be treated is presented.

3.1.1 Donor fundraising

Given as the main issue of the study, donor recruitment has become one of the main points for the Brazilian health system, looking for strategies that increase this incentive among the population, not with the responsibility of donating only once, but becoming increasingly more effective in blood donation and thus promote improved health, well-being and stable conditions of people with various blood-related diseases who need this gesture of solidarity. Through this, blood donation is one of these essential components for the functioning of these health systems, having great importance and ensuring the survival of these individuals.

3.1.2 Lack of knowledge about donation and possible fundraising strategies

The system that manages the donation of this blood still presents some problems, and there are some adversities that hinder the efficient execution of the process that involves the capture of blood, because, although Brazil still maintains a stable blood donation rate according to With world rates, there are still a large number of people who are unaware of the act and are not sure of a possible donation, according to research done to the public, do not express interest in the action and thus acquire a wrong knowledge about giving, thinking it might bring some harm to you. It is understood that health organizations should always strive to attract new donors, and increasingly make the number of effective donors to meet the anticipated demand and thus avoid that there is always a more urgent search for blood type, according to the specific need of the patient.

3.1.3 Java tool

Java is an object oriented programming language. Unlike modern programming languages, which are compiled to native code, the Java language is compiled to a bytecode that is interpreted by a virtual machine (Java Virtual Machine, better known by its abbreviation JVM). The Java programming language is the conventional language of the Java Platform, but it is not its only language. J2ME For computer and mobile programs, games, calculators, or even car radio.

3.1.4 Android

According DiMarzio, android is a mobile operating system that is based on a modifield version of Linux. if was originally developed by a startup of the same name, Android, Inc. 2005, as part of its strategy to enter the mobile space, Google purchased Android, Inc. and took over its over its development work.

3.1.5 Android Studio Tool

Android Studio is an IntelliJ IDEA-based Android development environment offering expanded model for Google Services and various device types. Rich layout editor with support for theme editing. Lint tools for performance testing, usability, version compatibility, and other issues. (ANDROID STUDIO, s.d.)

3.2. Prototype

The java iteration with android is briefly explained by the Horton "after we write a program in java for android, we click on a button to change our code into another form that is understood by android".

The Donation + application must serve all donor users or not, with a simplified registration to ensure sufficient information to expedite the registration process in blood donor hospitals, but it is necessary that every user scheduled to make their donation, must bring your required documents to the medical record opening.

The functionality of the application is based on some basic procedures adopted in hospitals, such as the name of the mother, which is important data to avoid any conflict with pseudonyms. Other information extracted from the research is the issuance of the donor card linked to REDOME - National Cancer Institute, with the standard rules of HEMOAM - Hospital Foundation of Hematology and Hemotherapy of Amazonas, the main one being having 3 consecutive donations in less than one year and the renewal of the card is the frequency of at least 2 donations per year.

For this application proposal was raised some basic requirements according to the features that it will have, demonstrating them in the following table:

Table 1 - Donation and Application Requirements

1	The user must register in the application stating the full name, Social Security Number, email, password, Identification Number, date of birth and mother's name.
2	After having a registration the user can login through the email and password.
3	On the home screen, the button for “Donate now” appears to schedule the donation.
4	Pressing the "Donate Now" button redirects you to the scheduling screen.
5	The schedule the user clicks on the desired date and marks the time to make the donation.
6	From the 3rd donation completed the system issues a digital donor card.

Source: Author

To facilitate its future development, interfaces were applied to the concepts of ergonomics, similar to what is expected from the final result, with the purpose of facilitating usability for all donor users.

Figure 1 represents the login screen and with the possibility that if there is no registration in the application the user can redirect and make his registration in it. Figure 2 represents exactly which fields are required to be filled in order to register. Figure 3 shows the application home screen with some information about the benefits your donation will provide while showing that it will not affect your health. Figure 4 shows the application menu with the options of cadastral update, donation schedule, donor digital ID and general information about the application and blood donations.

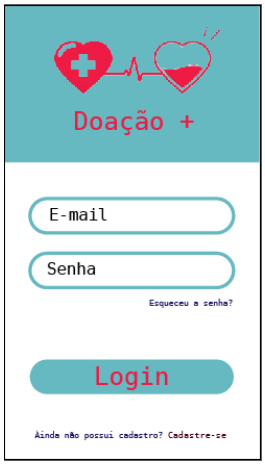

Figure 1- Login
Source: Author

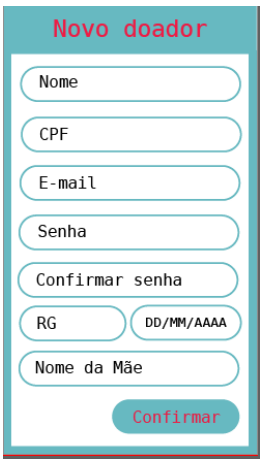

Figure 2- Register
Source: Author

Figure 3- Reserve
Source: Author

Figure 4- Update
Source: Author

In addition to these interfaces was developed the scheduling screens, additional information about donations and digital ID.

Figure 5 shows how the appointment will be made, a simplified action for the user to just select the desired date and time to attend the selected collection Hospital. Figure 6 shows other information and curiosities about donations, combinations, donor card privileges. Figure 7 shows the digital card issued by the system itself with all achievable benefits beyond its expiration date.

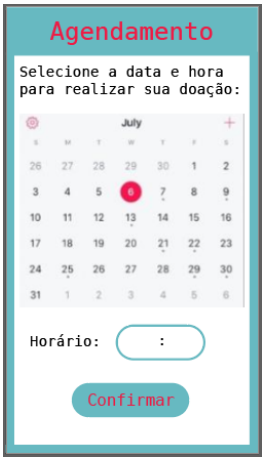

Figure 5- Scheduling
Source: Author

Figure 6- Informations
Source: Author

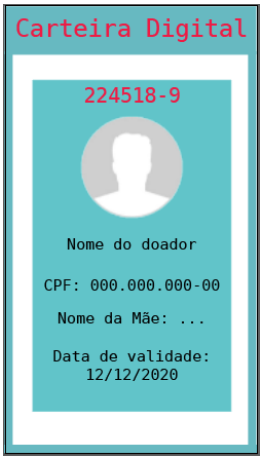

Figure 7- Digital Record
Source: Author

4. Results and discussion

4.1 Qualitative research

Questionnaire applied to people for the purpose of confirming that the person may be a blood donor or not.

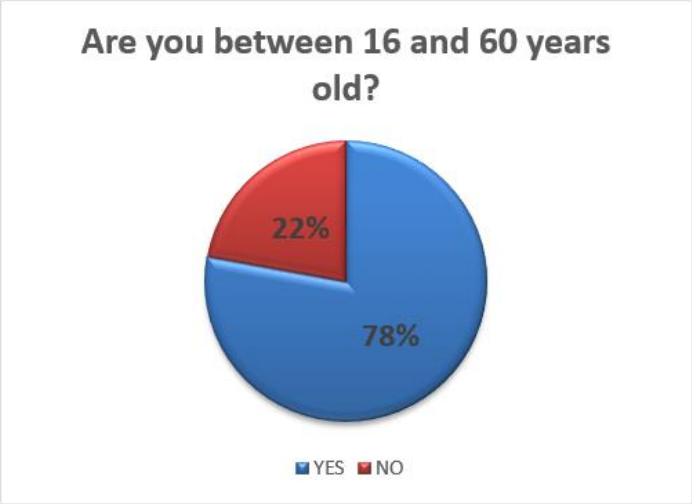

Figure 8 – Question about ages
Source: Own author

According to the responses collected from the survey sources, 78% of people between the ages allowed to make their first donation and 22% of those who cannot donate.

Figure 9 – Question about pounds
Source: Author

According to the responses collected from the survey sources, 77% of people weighing more than 50 pounds and 23% of those weighing less than 50 pounds were found.

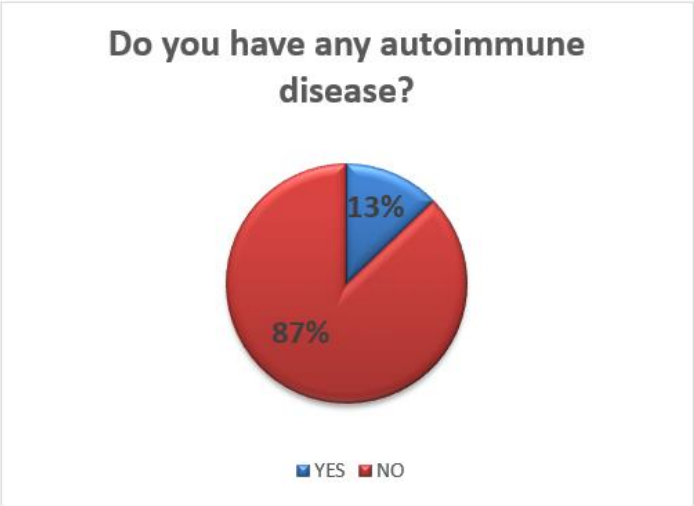

Figure 10 – Question about which ones have autoimmune diseases.
Source: Author

According to the responses collected from research sources, 13% of people with autoimmune disease and 87% of those without autoimmune disease were found.

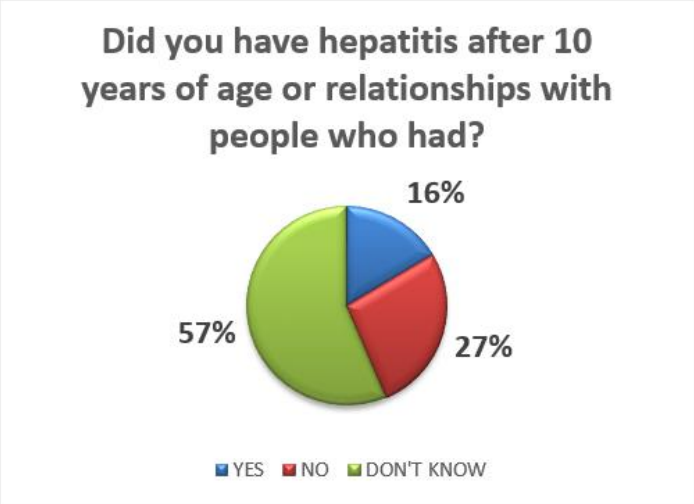

Figure 11 – Question about people who had hepatitis after 10 years or relationship with had it
Source: Author

According to responses collected from research sources, 16% of people who have some type of hepatitis or relate to people who have or have had hepatitis, 27% of those who do not have and / or did not relate to people who have or had and 57% of those who could not answer about their partners.

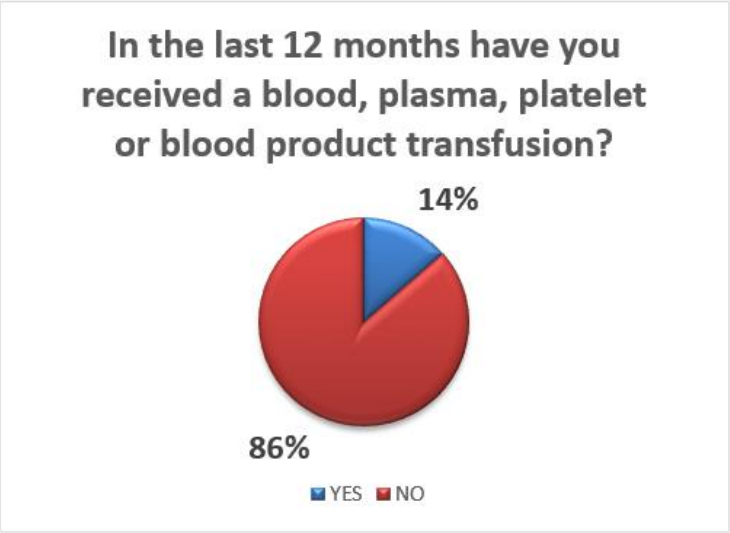

Figure 12 – Question about blood transfusion
Source: Author

According to responses collected from research sources, 14% of people who received some type of transfusion and 86% of those who did not receive transfusions.

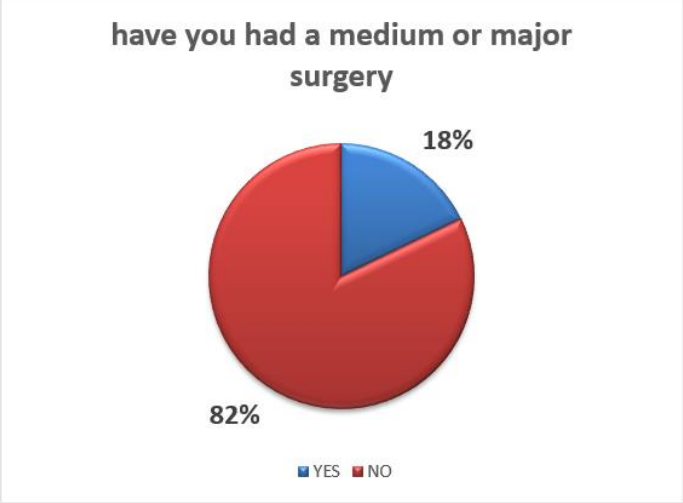

Figure 13 – Question about having had medium or large surgery in the last 12 months
Source: Author

The question, In the last 12 months have you had a medium or major surgery such as cholecystectomy, hysterectomy, thyroidectomy, colectomy, post trauma splenectomy, nephrectomy. According to the answers collected from the research sources, 18% of people who underwent any medium or large surgical procedure and 82% of those who did not undergo surgery of this size.

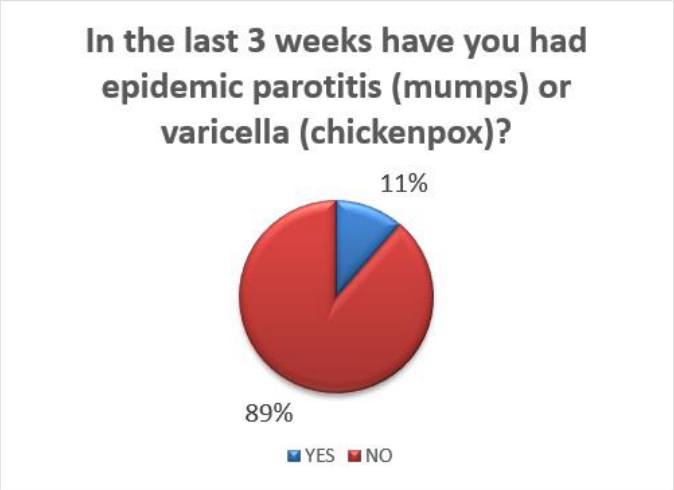

Figure 14 – Question about mumps and chickenpox
Source: Author

According to the responses collected from research sources, 11% of people who had mumps or chicken pox and 89% of those who did not.

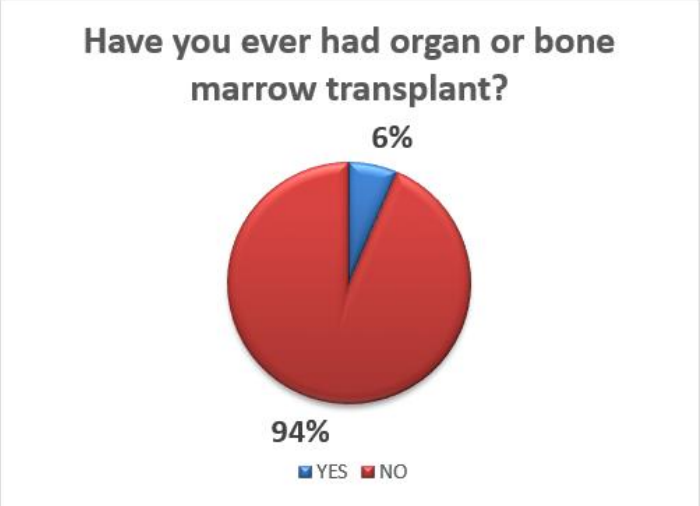

Figure 15 – Question about transplant organ or bone marrow
Source: Author

According to responses collected from research sources, 6% of people who underwent organ or marrow transplantation and 94% of those who did not.

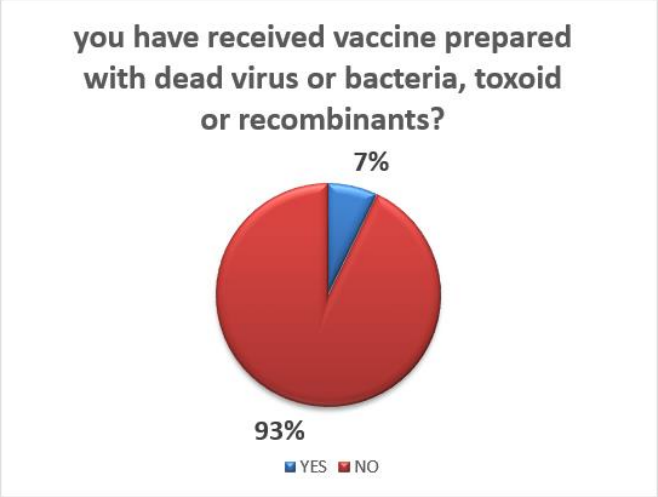

Figure 16 – Question about recent vaccination against viruses or bacteria
Source: Own author

The question, In recent weeks you have received vaccine prepared with dead virus or bacteria, toxoid or recombinants. Ex: cholera, polio (salk), diphtheria, tetanus, typhoid fever (injectable), meningitis, whooping cough, pneumococcus and / or flu vaccine? According to responses collected from research sources, 7% of people who received vaccine prepared with dead virus or bacteria were obtained, and 93% of those who did not.

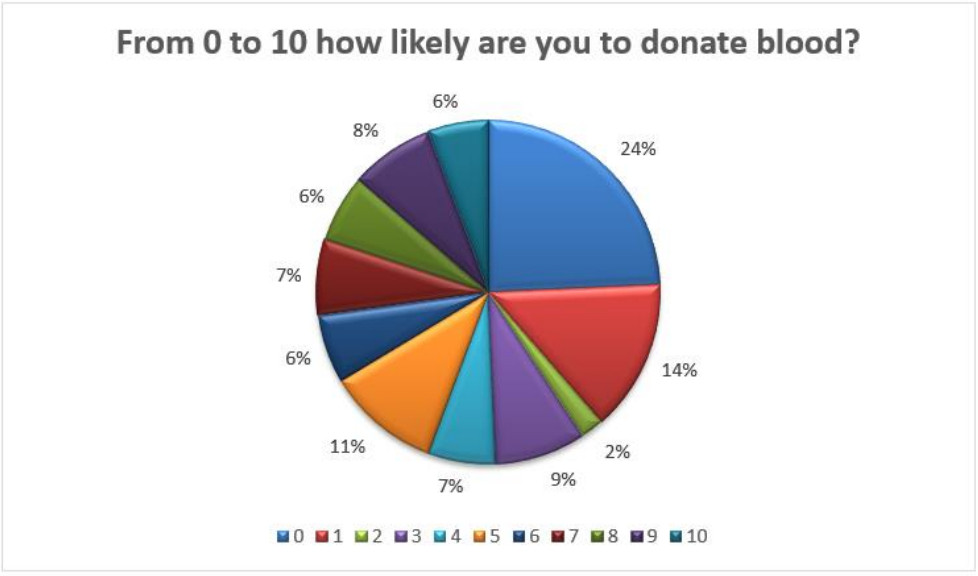

Figure 17 – Question about likelihood of donating blood
Source: Author

According to the answers obtained from the interviewees, many variants were obtained as to the certainty and willingness of people to donate blood or not.

The results found in the present study show that some people are not sure whether or not they want to donate, so there is a significant variation in the likelihood of respondents donating blood or not. It is

possible to affirm that there is a variation, especially in the extremes, if the person does not know the benefits that it can provide to the neighbor.

5. Final Considerations

Due to the revised study, the research consisted of knowledge of donors' behavior regarding blood donation, those who stopped donating and those who never donated. Qualitative research is a fundamental strategy for obtaining subsidies for directing actions to capture blood donors, because knowing their conceptions, values and feelings is essential to improve donor uptake and loyalty. Knowing the donor facilitates the fulfillment of their needs, seeks new benefits for them, contributes to their satisfaction and, consequently, to the increase in the blood donor population. Good donor service is a good practice to attract and make this person a donor effect, because offering better conditions to the donor, such as extending hours of service, greater availability of staff for their service and better collection conditions, is part of welcome to the blood donor.

In order to gain a better understanding of the population, what they think of the donation, and what their real interests are in donating, an application will be developed that will show in more detail the benefits to both donor and patient, and the importance of their donation. action and what ends will be given to it.

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