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A Study on Vaccination and Immunization Reminder of Children Through Mobile Phones.

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ABSTRACT

Nowadays children are prone to many diseases due to many reasons. Few reasons are the food habit and life style of the modern day children. The most important factor is that not providing vaccines at the proper time. Since both parents are working they cannot remember the date in which their child is to be given vaccination. Vaccination is the process of administering proper antigens to children at the proper time to avoid the attack of many lethal viruses. The work proposed is to develop an android application that reminds the parents for providing vaccines to their children and about the food diet they can provide to their children by sending app notification and through E mails once they register in the app.

Keywords: Vaccine, Immunization, Food diet, Antigens, Lethal.

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INTRODUCTION

A study says that providing vaccines to the children at proper time plays a major role in not only improving their health but also the cognitive development of brain and physical development too. Every vaccine has a period in which it is to be provided. Once missed it can cause many adverse effects because the vaccines are scheduled when the body's immune system works the best. Missing to administer a vaccine can also lead to skip some other vaccines. For example following an alternative schedule will lead to leaving children without polio protection till age 4. This will also delay the measles vaccine till age 3. Missing a single vaccine may lead to the cause of polio and/or chicken pox. So it is very much important to administer vaccines at the proper time.

In India the government announces vaccination administration through Radios and TVs. Nowadays Since everybody has a mobile phone it is easier to remind and create awareness of the vaccines through it. A study says that in USA nearly 300 children and 42,000 adults die due to vaccine preventable diseases [8].

There are a few applications available for vaccination reminder. Few are discussed here in this paper.

TECHNOLOGIES USED

First only a text message was sent to the registered users. This is done through SQL server for database and visual basic.net for development [4].

Then the proceeding apps had the advancement of sending reminder through e mail notifications. The same SQL was used for database management and depending on the device for which the application is developed and depending on the flexibility of the user different languages are used for front end design of the application.

MANAGING THE APP

Usually the app is managed at the clinical centre. The authorized personnel in the clinical center will get the details and register the children in the app and they will send the messages or emails to the parents depending on the application used. Some times in case of the doctors taking care of children of remote villages will be provided with this app in their mobile phones and they will schedule appointments and vaccinations for children. Once vaccinations are given they will update the details in the database. Maintaining the database will be done by separate set of personnel usually.

Each application developed using different methodologies are being discussed below.

BASIC WORKING OF THE APPS DISCUSSED

The app was developed for Xuanhan County, Sichuan Province, China [1]. The doctors were given this app. The app contains a database about the children in that area. The appointments will be made automatically by this app and will be notified to the doctor. The details about the children who missed their vaccines will also be notified to the doctor. The whole information will be stored in a computer system in the hospital. Depending on the notification the doctors will be able to provide special care to those children. The app will be installed with a group of doctors in the intervention arm and these doctors will reach out to the remote villages and provide care to children. The doctors in the control arm will record and manage the immunization details in their catchment areas.

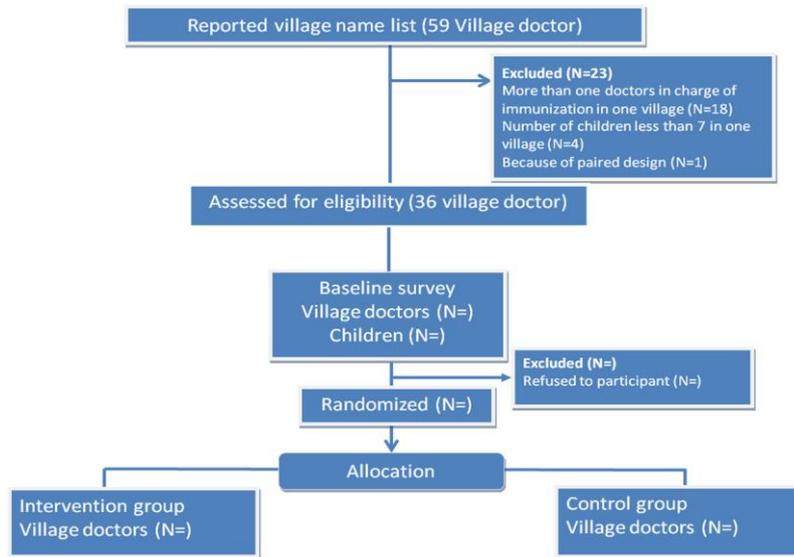


Figure1: Flowchart of study [1]

A cluster randomized trial is used here. The specific functionalities of the app are the following: automatically make appointments and then it records and updates children’s immunization information. Then with that recorded information the app generates a list of all the children who have missed their vaccination appointments, and the app sends health education information to village doctors who are in charge of the children in those particular villages.

A household survey has been used at baseline and at endline (8 months of implementation). The important outcome of the app is to achieve full-dosage coverage among the children even in remote villages and the secondary outcome is the immunization coverage of all the five vaccines which are being prescribed to the children that are being included in the national Expanded Program on Immunization program as well as the Hib vaccine, Rotavirus vaccine and Pneumococcal conjugate vaccine. A multidimensional evaluation of the app is being conducted to assess the usability and feasibility of the app.

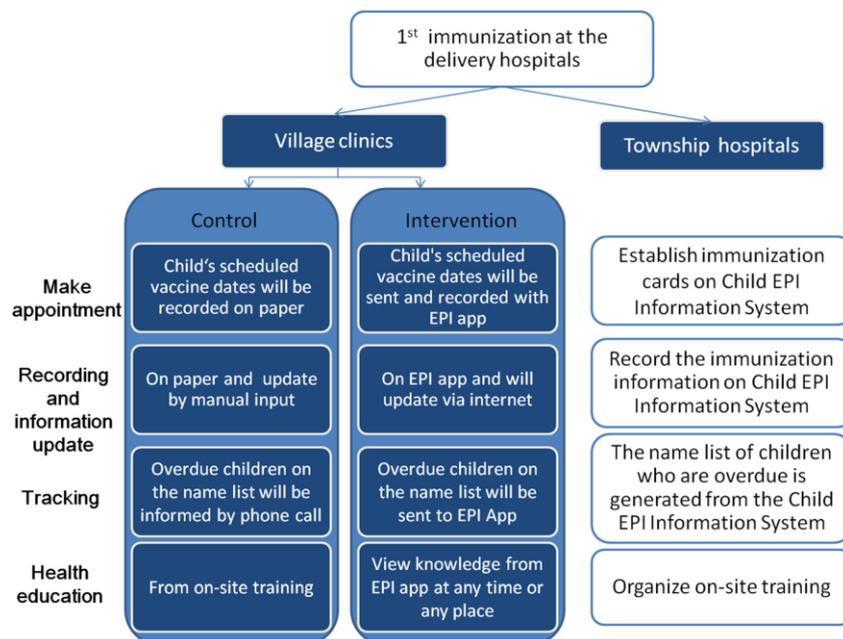


Figure 2: Management of immunization of children at township and village level [1].

In this app a prototype is proposed using open source data collection frameworks and to test its feasibility in improving the vaccination data collection in Kenya [2]. The prototype proposed here is

KenVACS. The vaccination data can be collected using mobile phones and the same can be visualized in the web application. An alert message is sent to the registered mobile numbers about the next vaccination date.

The application is used to collect the vaccination information and the demographic information of the patient. A small built in SQLite is used as the database to store this information. The same is transferred to the online portal via wifi.

The work flow of the app is discussed below. The details of the newborn are stored in the available system by the health staff. An android device is used for this registration process. All the details are stored in the database of the mobile phones and are later uploaded in the central database. Once uploaded the data in the mobile phone gets deleted automatically. Details such as gender of the infant, mother’s name, contact detail, patient’s unique id, Date of birth are stored.

The system continuously checks the database and produces reports of which the children’s due date of the vaccination. It automatically sends message to the parent’s registered number. After vaccination is being given it is also updated in the central database system. The parents may also know about the status of the vaccination given to their child by sending an SMS to the given telephone number with the necessary details.

The application proposed here is Evaccs [3]. This application works as follows; Every new born child is issued with a immunization card once they get registered. The card contains a NFC chip (Near Field Communication), which can be read/write by the android device multiple times. A system level unique identifier, record book id and the dates of the next vaccines will be present in the NFC chip.

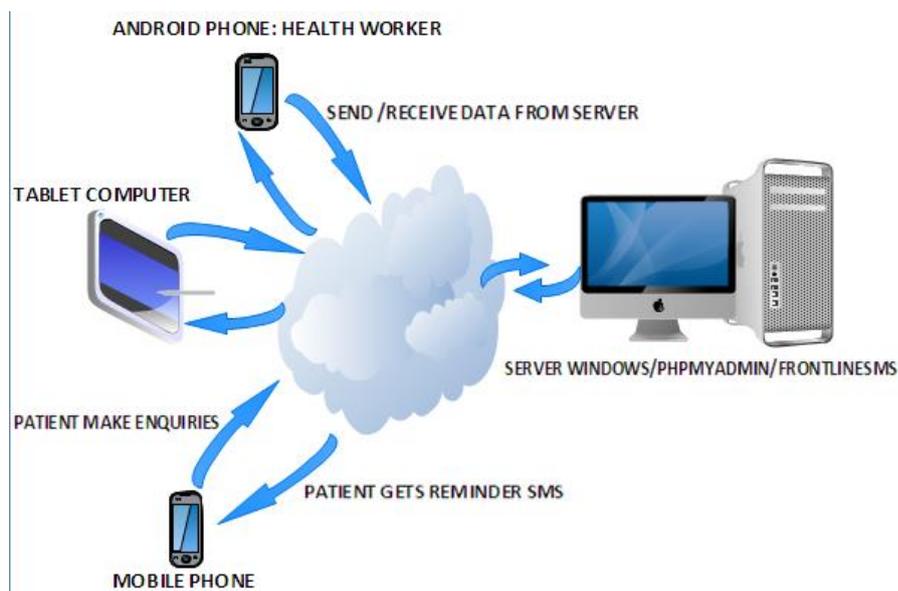


Figure 3: KenVACS system architectural design [2]

IMEI number is used to bind the phone number in the central database with the vaccinator’s smart phone which is installed with the application. Three things are being captures using this:

- I. Once the vaccinator adds these details it is counted as the task performed. This is done by the use of IMEI number.
- II. The data initialization is done based upon how the vaccinator allocates the designated locations. One such example of initialization is that the preloaded list of villages within the union council for a particular vaccinator.

- III. The due immunizations of the infants are added in the due immunization list of the app of a particular vaccinator.

Every information is uploaded in the central database. Some of the informations uploaded are child records, the geographical coverage, attendance of the vaccinator, etc. All the stored information in the database is available in the front dash board for the supervisors and the policy makers for performance review. If the given card is lost then a new card is provided with the same unique number with the help of the central database. Alert messages are sent directly from the central dash board to the parent’s mobile numbers which has been registered in the central database.

In this a prototype was developed for sending messages to mobile phones [4]. This was developed using visual basic.net and SQL server for database. The system can be used only by the authorized user who has the correct user name and password. Once logged in the user (in this case the hospital authority) can send message to the parent who has registered for SMS alert in the clinic. The message will be sent from the service provider starting 2 days before the date of vaccination to be provided. The message contains name of the child, name of the vaccination to be given, date, name of the health center. The information will be stored in the database. The user can edit the information of the child and can add new child information.

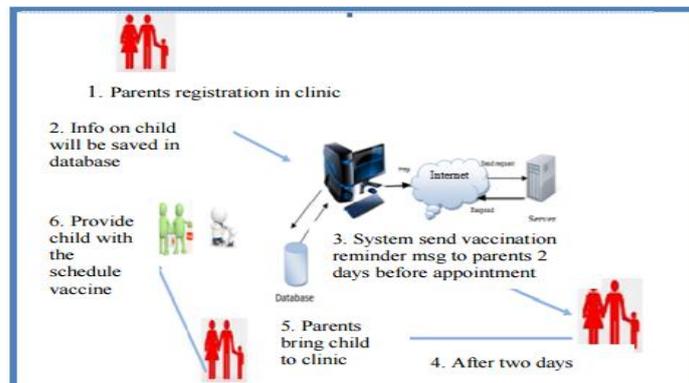


Figure 4: Architecture of the proposed system [4]

A multi-stage approach has been used to build a system that helps to meet the requirements of the mothers and the health workers in Benin [7]. The VaxTrac system is used to send SMS alert to the mothers. First as a pilot test SMS features are tested in a small group of clinics and the effect of sending reminders has been determined by the parent’s adherence to the vaccination schedule.

The variables which are taken into account are the language spoken by the users and literacy, the demographic information, way of learning of the vaccination sessions main variables of interest in these interviews included: general demographic information, and finally the user’s preference and comfort level on receiving SMS through mobile phones.

The Immunization information systems (IISs) proposed here is a confidential and a population-based system [9]. It is a computerized database system which records all the doses of vaccinations that are being administered in a given geographical area. This also helps the health care providers by facilitating the vaccination history for determination of client vaccination. It also provides aggregated data of the immunization programs which are being used to monitor the coverage and guide the public. This proposed system works based on two methods: Evidence

Acquisition, Evidence Synthesis.

The proposed system provides a system model to deliver vaccination service routinely in Uganda [10]. This system uses a very low resource settings and it incorporates vaccination suppliers entire infra structure to vaccination receivers. The proposed model introduces many ways to improve service quality and motivation for the care takers and complete access to all the vaccines to administer the whole vaccine in the schedule. The system also has a GUI for the users.

A geographically centralized outreach program is proposed by the system. This system helps in direct connection between the District vaccination stores. This helps in reliable distribution and availability and quality of vaccines. The families in Uganda have a very less knowledge about the vaccination administration dates and they lack motivation in completing the whole schedule of the vaccination. This system provides the community health workers to give families the proper exposure and education towards the vaccination schedule with the help of this coordinated outreach program provided by this system.

CONCLUSION

These applications to remind the parents about the vaccination schedule have used many different languages and techniques including Visual basics, SQL for database and so on. Various types of techniques such as providing the parents with a card embedded with a chip with all the details, sending SMS from the clinical centre, and android applications are also being used.

When it comes to using cards with chip, the chip can be damaged or the parents can misplace or lose the card. When it comes to sending the text message from clinical centre, if the person meant to send the message forgets then the vaccination schedule will be missed.

Among this android application is better since everyone has a mobile phone and android apps are very much user friendly and easy to access. Since sending notification is automated the parent will get the notification always and the vaccination schedule will not be missed. Since Java is very much user friendly, it is better to use it while creating the front end design of the application and SQLite for back end development of the application.

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