Smart System for Effective Implementation of Janani Suraksha Yojna (JSY)

Tofiq Quadri[1] Firdous Nath Hussain Gadisaaz[2] Kamesh Dashora[3] Bhumika Shrimali[4] Chitrang Ambikar[5]

[1,2,3,4,5]Department of Computer Science & Engineering

[1,2,3,4,5]Geetanjali Institute of Technical Studies Udaipur, Rajasthan 313001, India

Abstract— Janani Suraksha Yojna is the scheme introduced by the Government of India for safe motherhood and to reduce neo natal mortality by promoting institutional delivery among rural women. It provides cash assistance to women other than offering pre-delivery and post-delivery care. The Government of India coordinates with the community health workers instituted by Ministry of Health and Family Welfare called Accredited Social Health Activists (ASHA) to help the pregnant women in getting the necessary services. The aim of this project is to create a smart system that can help the Primary Health Centers and the ASHA workers to effectively track the pregnant women and assist them through technology. The use of mobile devices to get timely assistance related to medication, doctor visits, dos and don'ts etc., in the form of videos would greatly help the women to take better care of themselves and in turn reduces the infant mortality rate. This system integrates all such information in one place and gives a better visualization for the different stake holders like the doctors, patients, health care workers and the government officials about the effectiveness of implementation of the scheme.

Key words: Janani Suraksha Yojna, Pregnant Women, Institutional Delivery, Infant Mortality, Technology In Health Care

I. INTRODUCTION

The extent to which the technology has reached these days have opened up new possibilities for the developers to create a wide variety of applications that can greatly serve the community in one way or the other. In countries like India where there is a huge digital divide, the schemes like JSY would take more time to achieve its objective. The community workers in villages are trained for this purpose to better act as ambassadors for the government in explaining the need for proper health care and institutional delivery to the poor women in rural villages. The ASHA workers get in touch with the pregnant women and track their progress over the period of time and report it to their higher authorities during their monthly meeting. The need for breast feeding the infants and the proper ways of doing that is also to be highlighted to reduce the malnutrition rate in children.

This kind of interaction greatly helps them in understanding the needs of the pregnant women and also encourages the patients to better utilize the benefits provided by the government. There are incentives for the ASHA workers as well as the women for the institutional delivery. The ASHA workers also get the cash rewards for getting the infant vaccinated in time. With the vast population in India, it's very difficult for the ASHA workers alone to track all the cases of pregnancies and provide the necessary assistance. To overcome this issue, the technology has to be used effectively right from the registration of the patients for the scheme till the vaccination of the babies.

Timely information is the key when it comes to treating pregnant women [1]. Moreover, in spite of the government spending for the rural welfare schemes like JSY, the lack of awareness about the scheme and inaccessibility of the patients in remote areas by the ASHA greatly affects the initiative of the government in encouraging institutional deliveries. With illiteracy playing a vital role in preventing the women in rural areas to approach the government facility, the issues with traceability of the pregnant women adds woes to the people who are at the ground level of implementation. Proper technological support and the creation of awareness among the rural women is the key to successful implementation of projects like JSY.

II. LITERATURE REVIEW

This section reviews the technology being used in health care for effective handling of the patients. This technology includes the hardware, software and the systems that are used in simplifying the task of the doctors and patients. Also, the issues with using technology in handling large scale projects has been discussed.

A. Review of the use of technology in health care

The use of technology in health care started with maintaining health record of the patients. The introduction of Electronic health records (EHR) has greatly benefited the patients in making the task of maintaining the health-related information. This has also helped the doctors in understanding the patients in a proper way due to the availability of information. The unstructured information has greatly affected the classification of information or automating the decision-making process.

B. EHR

Electronic Health Record helps to store the information related to the patient's health background, treatment history, medication, lab test results etc. The information available through these EHR could be used by the doctors, pharmacist and the lab technicians to update the information pertaining to the patient's treatment. The need for integrated information for the EHR has been highlighted in the work [2]. The need for integrating the information into EHR is to give the more specific information to the doctor to give timely treatment for the patients. The collective information available in the EHR could be used by the

government to identify the kind of issues faced by the public in a specific geographical region. [3] in his work highlights the information related to the obesity of the people in a specific area through the BMI (Body Mass Index) values of the EHR available in the repository. With a huge population in countries like India, survey of status of health is a cumbersome task as it requires lot of staffing and manual work.

C. Wearable Computing in healthcare

Intelligent systems are used in contact with the body such that they are able to detect, process and inform those parameters to the centralized server for further action. The two approaches used in wearable computing are "application-pull" and "technology-push" wherein either the information is either pulled through the application or the device itself push the data as and when they record it [4]. The use of Information and Communication Technologies (ICT) has greatly helped in timely retrieval of necessary information for decision making which inturn saves the lives of patients. Wearable devices for pregnant women gives information pertaining to their different stages of pregnancy to the doctors treating them so that they can track their patients' health remotely.

D. Use of Internet of Thing (IoT) in health care

IoT plays a major role in making the environment smart and leads to unaided decision making wherein the system itself will decide the appropriate action to be taken and forwards that to the appropriate stake holders like doctors, patients, etc. The latest devices available in the market are handy enough for the patients themselves to wear during their day to day activities [6]. These devices generate huge amount of data that are then forwarded to the data centers for storage and analysis. The smart ECG sensor used in [5] highlights the information recorded through the ECG device and enables the doctor to identify the people who are prone to cardiac diseases. Such information helps the patients also to take timely care of their health to avoid catastrophic in future. The elderly monitoring system proposed in [7] captures the brain signals of elderly patients and analyze them in the background so that it can detect the onset of stroke and alert the doctors appropriately.

E. Problems with existing technologies

The following are the issues with the kind of technological support available in India. They are,

- Improper technical support in handling patient information.
- Lack of information pertaining to the pregnant women at different stages of pregnancy.
- Non-availability of notification system for ASHA workers about their patient's treatment.
- Lack of data for predictive analysis of patient's health condition.
- Less reach of scheme among the poor and uneducated women.
- Lack of visualization of the data obtained through the Primary Health Centers.

The above-mentioned problems could be resolved by creating an interactive system that records the details of the patients at various stages of their pregnancy. Such a system would also act as an aid for illiterate mothers in assisting them with the do's and don'ts during their pregnancy cycle.

III. PROPOSED WORK

The proposed work has the following modules viz, registration, treatment, payment & notifications, information management and report generation for effective implementation of Janani Suraksha Yojna Scheme. The motivation behind this project is to reduce the infant mortality by increasing the number of institutional deliveries through effective tracking of patients and enabling timely assistance to the pregnant women.

A. Registration Module

Fig. 1: User interface of JSY

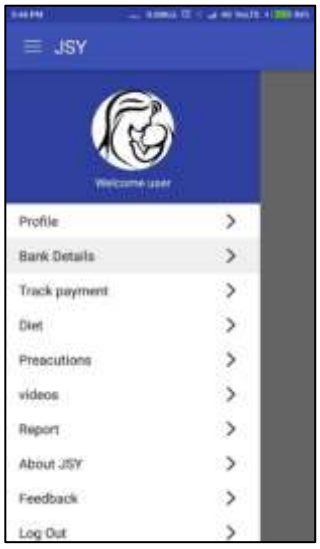

Fig. 2: Registration interface

Fig. 3: Treatment Interface

This module helps in registering the stakeholders of the system viz, doctors, patients, ASHA worker and the Primary Health Centers. The patient registration module is based on the Aadhar number (Unique Identification number issued by Government of India). The system allows scanning of the Aadhar number of the women whose pregnancy is confirmed by the doctor. The doctor can add the details like the patient's height, weight, blood group and the date she got conceived (based on test results). The system then automatically generates the tentative date of delivery and the appropriate intervals during which the patient has to visit the doctor. Fig.1. shows the screenshot of the patient registration module and fig. 2. Shows the patient interface of JSY. This module also registers the other stake holders of the system viz. ASHA workers, lab technicians, pharmacist and other government officials.

B. Treatment Module

This module provides the doctor the necessary interface to update the details related to the treatment of the patient. The preliminary information related to the patient's basic health parameters like blood sugar, blood pressure, pulse, height and weight are recorded before the treatment (fig.3). The doctor then prescribes the necessary medication for the patient accoeding to their health condition. The doctor's interface shows the treatment history along with the history of medication in the past. The interface supports the treatment of patients by different doctors across the PHC at different places. The issue of medicine gets reflected in the inventory and the lab technician (fig.6) can update the information related to the tests recommended by the doctors.

C. Payment & Notification Module

The ASHA worker will be assigned the patients according to their locality and they are notified about the patients turn to visit the PHC. If the patient could not visit the PHC on a speific date, AHSA will be informed to report about the status of the patient. Each time the patient visits the PHC intime some credits will be added to ASHA worker which can then be used to identify the effectiveness of the worker. The payment interface for patients and ASHA enables them to update their account information (fig. 4) such that they will be credited the payment evrytime there is an institutional delivery. The notification module also provides the popups or remiders through call to the patients about their date of consultation with the doctor. Also, the patients will be reminded about the timely intake of medicines.

Fig. 4: Bank account registration

Fig. 5: Health advice for women

Fig. 6: Lab Tests prescribed

D. Report generation Module

This module helps the government officials and policy makets to visualize what is happening across the different states of the countries and the way the system can be improved. The data generated through this sytem is filtered through different views according to the role of the users. The graphical representation of the effectiveness of the scheme plays a major role in decision making. Also the patient report module gives an insight for swift verification by experts to determine the kind of treatment given by the doctors. The reports on the children being delivered through institutional delivery helps the government to monitor the sex ration across the states.

E. Information Management Module

This module helps the health officials to provide the necessary video materials to the pregnant women related to food, health, hygene and exercises to be followed at different stages of pregnancy. Since these were in digital format and proper internet facility may not be available in rural areas, these information will be automatically loaded in to the patient's handheld device when they come for visit to the PHC. The information thus loaded, gets automatically played at the appropriate months of

pregnancy and helps the patients to get educated (fig. 5). The application is made as simple as possible such that the patient need not find any difficulty in accessing them as the system decides the video to be played automatically. The panic option given in the patient module helps the patient to contact a ASHA worker in case of an emergency and inturn alerts the ambulance service for assistance.

IV. CONCLUSION AND FUTURE WORK

This project address the issues with efefctive implmentation of the JSY with the help of technology. Also, the managebility of such large schemes intiated in countries like India is made simple through different interfaces being provided for the stake holders. The future work aims at integrating IoT technology with handheld devices that can detect the basic health parameters of the patients and automatically forward it to the cloud. Moreover, we are planning work on the background analytics of the data thus collected inorder to predict and alert the respective people for timely assistance of pregnant women. We also have plans to work for the welfare of the child through tracking of their vaccination history and identification of issues with malnutrition of kids in rural areas.

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