Survey on E-healthcare for Rural Women

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ABSTRACT

The most significant period for a woman in her life is the pregnancy and delivery time. Especially in rural areas of India, there are many cases of maternal and baby mortality. These are mainly due to the lack of proper care and attention given to the pregnant woman during their pregnancy period. The women in urban areas have more facilities for their periodic health check-up in sophisticated hospitals. Using many electronic devices, they can schedule their health check-up and vaccination dates. They can easily clarify their doubts during pre-delivery and post delivery period through internet. In rural areas, these opportunities are rare for the pregnant ladies. Even if it is available, they will not be comfortable in using them because of lack of knowledge in them. Hence, an idea has been proposed to periodically guide the pregnant ladies through SMS, voice messages and personalized advice and tips in their native language by collecting data from the history of each individual patients. They can access their entire check-up history along with doctor's name and contact. The process for digitalizing medicinal information into e-Prescription format is done, hence it is easy to maintain a detailed and digitalized record for future treatment purposes.

Keywords: *Child, Pregnant Women, Rural Areas.*

1. INTRODUCTION

The most important period in a women's life is pregnancy. Women in urban areas are well educated and they are capable of taking care of themselves. In rural areas[3], pregnancy leads to stress both emotionally and physically. There are no proper resources, financial stress, lack of nutrition are all the major issues. Due to these reasons the rate of maternal and baby mortality is high in rural areas[3] when compared to urban areas. Hence, women in rural areas [3] need some assistance during their pregnancy period to take care of themselves. Since women in rural areas[3] are not highly educated, our idea is to assist them by sending periodic SMS, voice messages to their mobile phones. This will motivate them to visit doctors for their regular health check-ups. The basic necessity is the mobile phone and Internet connectivity. This method will be very helpful since hospitals in rural areas [3] are less. This method will help in remote monitoring of pregnant women[2] and development of the child[1]. Additional details like the various Government schemes that are available for pregnant women[2] can be sent as a notification / message to the registered women. Starting from the first month and even after the childbirth, personalised messages are sent to the registered pregnant women[2]. Checkups dates, Diet plans for each month and everyday diet charts and voice notes to help the women who are illiterate. Even after the childbirth, the vaccination chart for the baby is sent to them and SMS about the vaccination details are also sent regularly. The interface used to send messages and audio (voice notes) are done by Remote Procedural Call mechanism, which is one way communication medium. Based on the pregnancy period given during registration is taken as the input by the server, time and dated are sorted and sent to the necessary person. The data of every registration and its updated information are stored using RDBMS (Relational Database Management System) and it is encrypted by using Advanced Encryption Standard algorithm. The data collected from the registered women are protected, highly secured and private.

2. LITERATURE SURVEY

Jayaseelan et.al [1] has shown the usage of the smartphone application during pregnancy comparing the usage of mobile phones in lower and middle class families and also the upper class families. It shows that according to BOSTON CONSULTING GROUP (BCG), the usage of internet is highly found among women in the rural areas[3] of India who are actually the regional language speakers. The survey also shows that nearly 65% women are using pregnancy application. It provides the data about the percentage of pregnant women [2]who are really benefited by the use of smart phones, analysis about the time they spend daily in those pregnancy apps. Nearly 45% women use smart phones and healthcare applications when compared to men. It reveals that with the use of these kind of pregnancy applications, pregnant women[2] are able to save more amount of time, able to track the growth progress of child[1], helps in setting reminders on a daily basis and also they assist them even after the child[1] birth. Some issues are rural women even though feel comfortable using smart phones, some may have financial issues and some may not adapt immediately to new technologies but these issues can be solved by providing necessary training and awareness programmes in rural areas[3] and with the help of Government schemes for pregnant women[2].
not adapt immediately to new technologies but these issues can be solved by providing necessary training and awareness programmes in rural areas[3] and with the help of Government schemes for pregnant women[2].

Oluwagbemi.N et.al [2] has discussed about developing AMAHD (Android Mobile Informatics Application for some Hereditary Diseases and Disorders) and spread awareness about the hereditary diseases. The objectives are to create an android mobile application that will act as a reference point. It provide useful information about various hereditary diseases to medical personnel and professionals. It gives additional educational resource to biological and bioinformatics researchers in different higher institutions. It is a diagnostic and complementary foundational learning tool. The technologies that are used to develop AMAHD are using programming languages in Java and XML (Extended Markup Language). SQLite was used to implement the database. Logical Disjunction Rule-based Algorithm (LDRA) is used for the development of module. The issues that were sorted in this paper are the user can detect the diseases at any instance. The user can achieve a little knowledge on the diseases. The issues that are obtained in this application are internet issues, it helps to find out diseases that are stored in the database. The result that is obtained from this application are in the first phase, 87 people participated in classifying the hereditary diseases as either common or rare .In the second phase, 100 people participated in classifying the hereditary diseases as either a common type or a rare type within their respective regions. A comparative analysis was also given based on the question answer by the user.

Uddina.et.al [3] has discussed about the usage of software called mTika in which pregnant women [2]in rural areas[3] must register with all their details .After childbirth they must send an SMS to the registered scheme about the child's date of birth and all other details . With the help of health workers who give necessary training to women to use the software provided. Every four weeks, the mother will receive a reminder about the type of vaccine for the particular month for the new born baby. There is no need of maintaining any physical cards for tracking the vaccination of child[1]. They conducted an interview and collected real time data from pregnant women[2] to know the percentage of women who felt comfortable using the software and the percentage of women who missed to send the SMS after the childbirth etc. This was implemented in low income rural areas[3] in small communities. Educating and creating awareness to rural pregnant women[2] of other areas will improve the health and immune system of the child[1]. It helps in prevention of any disease in future.

Marufu et.al [4] describes about the utilisation of mobile for determining the everyday health of a user. They are tend to focus on the collection of patient's data rather than meeting the doctor in person. The objective is to determine the use of mobile health and identifying and describing the opportunities and the challenges faced by the medical doctors in using mobile health at a specific health care facility in Zimbabwe. The method of quantitative, descriptive, cross-sectional and analytical design was used to determine the rate of utilisation of selected mobile health "patient identification and treatment activities" by medical doctors. The issues that are found are the research was conducted at one health care facility in the country out of the available five. The results cannot be generalised to the entire population of medical doctors in Zimbabwean health facilities. The focus of the research was only medical doctors but the possible list of mobile health users could include nurses, pharmacists, lab technologists, radiologists and patients. The results suggest that fifty percent (50%) of the respondents indicated, lack of knowledge and unawareness in using mobile health to support chronically ill patients. The majority of the respondents (83.3%) believed that mobile health presented opportunities to improve health care delivery. The majority of the respondents (95%) indicated the potential for its future use.

Tehrani et.al [5] has discussed about the pregnant women[2] making use of smart phone applications, social media and various other sources to maintain their health during pregnancy. It is helpful in gaining knowing about their nutrition, child[1] growth, complications or any updates .Changes will be recorded automatically in the history about the pregnant women[2] starting from the first month. It helps in remote monitoring of the fetal growth, stress test that can be taken at home itself by using application that are available. It reduces the travel so that their comfort is maintained. Any queries related to complications and pregnancy can be answered remotely and guidance can be provided to pregnant women[2] anywhere at any time. Child's heartbeat rate can be monitored by collecting real time data and storing the reports in cloud using some algorithms. The issues that are found if some critical situation occurs it does not send the data or update the patient information, it can only be checked in presence of a doctor.

Alam. et.al [6] has discussed about the application, called APONJON provides messaging service and voice calls that helps to utilise the mobile application. The messages are sent to pregnant women[2] who have registered for this scheme. The messages are sent to them every month as a reminderfor their health check-ups, nutrition details .Voice calls are an option which is available. The pregnant women's family member can also register for daily updates about the diet plan for the pregnant women [2]. Data are collected from all the registered pregnant women[2] to know the feedback about the application .Interviews was also conducted among group of women to know the application's benefits. Implementing these kind of systems all over the world will be very helpful in improving the child[1] growth. It will help reduce the mortality of child[1] and the pregnant women[2]. The issues that were found are only the usage of this application were more in urban than in rural regions.
A survey conducted mainly in the rural areas[3] of Bhopal.

*Joshi.P.*et.al [7] has discussed   about collecting data from pregnant women's BMI (Body Mass Index), Haemoglobin content using Haemoglobin meter, collecting the details about the past abortion, their height and weight and other details. The study shows that 79% of pregnant women[2] in urban areas are high maternal nutrition and only about 57% of pregnant women[2] in rural areas[3] are with proper nutrition. It also shows that household pregnant women[2] in rural areas[3] are facing malnutrition problems more when compared to pregnant women[2] who are working. The incentives which are received from Government are used for other household purposes instead of using it for the rural pregnant and lactating mothers. It shows how many percentage of women in rural areas[3] of India and other parts of the world are affected due to malnutrition every year and also the importance of guidance and advices which are need to be given to rural pregnant women[2] on a regular basis to avoid mortality of pregnant women[2] and the foetus.

Watkinsa.et.al [8] has discussed about the implementation of a health demographic surveillance system to provide communication for the rural region of South Africa through smart phone. The studies examines current use of health related digital mobile communication. The module helps to connect online communities to discuss on health issues. It mainly focus on pregnant woman and people who are infected with chronic diseases. Recording of calls which is password protection and destroyed after transcription is a feature that is added to benefit them. These techniques help patients engaged with a clinic, initiated on m-health intervention. These problems that existed on same having names were sorted out by assigning ID number. The result that was obtained are 68% of the diseases is sorted out through communication the surveillance system spread over 32 villages reaching 16,000 households. The issues that were found are lack of digital infrastructure and high cost of network usage may lead this process to slow down.

Gurung et.al [9] has discussed about the status of birth preparedness (BP) and Complication readiness (CR) among rural pregnant women[2] in areas of Southern India – Udipi. The study was conducted by interviewing women in the second and third trimesters using questionnaires. These questionnaires are used to collect data from the pregnant women[2] and those who answered at least three questions out of five were considered that they were aware of BP and CR .The results obtained from this study are the data about the percentage of women receiving the Government financial schemes, women who have already faced complications in previous pregnancy. It also collects data about their regular health check-up, injections and medications .The main issue in this method will be there is no assurance whether the pregnant women[2] are really aware of all the complications that might happen during pregnancy since the questionnaire might not be enough to decide. Some women may not show any interest to participate in these kind of programmes. With the help of this study it shows that the lack of awareness leads to complications and imparting complete knowledge about pregnancy is important in rural areas[3] by conducting several training programmes and making the rural women to actively participate in these awareness programmes

Su Yuan et.al [10] has shown how SMS advice impact and change the behaviour of pregnant women[2]. SMS provides various information starting from the first month of pregnancy like regular health check-up dates, nutrition details, Government Schemes for pregnant women[2], parental care , vaccination details and child[1] care .It helps to observes the change in behaviour of pregnant women[2] after receiving regular SMS advices. There improvement in health and the child[1] growth are monitored. To know the outcome and the effects of this SMS advice method, interview was also conducted among various rural women groups in China by collecting data from them. The result suggests that the implementation of this SMS advice mechanism in large communities across the world especially in rural areas[3] will show a huge improvement in the health of pregnant women [2]and also in development of child[1]. The issues that were found are most of the women in rural women do not have access to internet.

S.NO	PAPER	APPROACHES	RESULT	ISSUES
1	Mobile phone use among patients and health workers enhances primary e-healthcare: A qualitative study in rural South Africa	Implementation of health demographic surveillance system providing smart phone for the communication in the rural region of South Africa. It focus on pregnant woman, people infected with chronic diseases	68% of the diseases is sorted out through communication the surveillance system spread over 32 villages reaching 16,000 households	Recording of calls which is password protected and are destroyed after transcription Lack of digital infrastructure and high cost of network usage may lead this process to slow down
2	Android mobile informatics application for some hereditary diseases and disorders(AMAHD):a complementary framework for the medical practitioners and patients in medicine	Android based application is created to detect the hereditary disorders and to formulate a survey based on the results	In first phase, 87 people participated in classifying the hereditary diseases as either common or rare .In second phase, 100 people participated in classifying the hereditary diseases as either a common type or a rare type within their respective regions	Poor network connection
3	Utilization of mobile health by medical doctors in a Zimbabwean health care facility	The methodology of quantitative as well as descriptive and analytical design was used to determine the rate of utilization of selected mobile health "patient identification and treatment activities" by doctors	50% of the respondents indicated, lack of knowledge and unawareness in using mobile health to support chronically ill patients 83.3%believed that mobile health presented opportunities to improve health care delivery 95%indicated the potential for its future use	The research was conducted at one health care facility in the country out of the available five. The generalization of the result can't be formulated for entire population of medical doctors in Zimbabwean health facilities
4	Birth preparedness and complication readiness among rural pregnant women :a cross sectional study in udipi ,Southern India	The study was conducted by interviewing women in the second the third trimesters using questionnaires	40% of the women are educated and can understand the initial courses	Lack of awareness leads to complications questionnaire might not be enough to decide. Some women may not show any interest to participate in these kind of programmers
5	Nutritional status of pregnant women [2]reporting at rural helath training centre	The study was conducted by collecting data about the pregnant women's BMI(Body Mass Index),Hemoglobin content using Haemoglobinometer , collecting the details about the past abortion	79% of pregnant women[2] in urban areas are high maternal nutrition and only about 57% of pregnant women[2] in rural areas[3] are with proper nutrition	Lack of awareness for the pregnant woman in rural areas[3]

6	Usage of smartphone apps by women on their maternal life	Survey to predict the usage of mobile phones in lower and middle class families and also the upper class families	65% women are using pregnancy apps Nearly 45% women use smartphones and healthcare applications when compared to men	rural women even though feel comfortable using smartphones, some have financial issues and some may not adapt immediately to new technologies but these issues can be solved by providing necessary training and awareness programs in rural areas[3]
7	How advances in digital health benefit pregnant women[2]	pregnant women[2] can use smart phone applications, social media and various sources to maintain their health during pregnancy Stress test can also be taken at home by using apps that are available	Online stress monitor and other calculation may not be accurate at all times	using these kind of technologies provides security of information, reduces any manual errors ,also the travel cost and the health checkup costs are reduced
8	Impact of an SMS advice program on maternal and newborn health in rural china: study protocol for a quasi-randomized controlled trial	Using SMS technology the pregnant woman behavior are monitored	Nearly 94% rural women are with basic primary school education hence the study shows that reading the SMS advices will not be an issue for rural women	Lack of facilities in the rural areas[3] of china
9	Impact of mobile phone based messages on maternal and child[1] healthcare behaviour: a retrospective cross sectional survey in bangladesh	Using application called APONJON which provides messaging service and also voice calls	improving the child[1] growth and will reduce the mortality of child[1] and the pregnant women[2]	Not many are aware of this application and doesn't support regional language
10	Use of mobile phones for improving vaccination coverage among children living in rural hard-to-reach areas and urban streets of Bangladesh	It is the study about the usage of software called mTikain which pregnant women[2] in rural areas[3] must register with all their details	No need of maintaining any physical cards for tracking the vaccination of child[1]	Data is not highly secured Implemented only in low income rural areas[3] in small communities

3. CONCLUSION AND FUTURE ENHANCEMENTS

Since the maternal and the baby mortality rate is high, it is very important to provide necessary methods to improve the growth of baby and proper nutrition for pregnant woman. In future, these methods are implemented in small areas and if it is implemented in large areas and communities will decrease the mortality rate. Some women may find it difficult to adapt to new technologies but this can be overcome by providing necessary guidance .The same methodology can be implemented as an application, SMS services and voice calls in all regional languages.

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