

Impact of mHealth in new born care

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Abstract: Mobile phones have become an integral part of our day to day life. This has become a common man's gadget. With several service providers coming up with very competitive rates for data usage, mobiles are no longer restricted to making calls. It has become an easy means to connect to internet. With many service providers coming up with competitive data plans even common man can afford it. This evolution has changed the way many services used to work. All online activities got triggered with advent of mobile phone technology. Health industry is also exploring its possibilities of going mobile. mHealth or mobile Health is a term associated with health services integrated with mobile phones. Neonatal care via mHealth techniques can curb infant mortality to a very large extent and affect the Infant Mortality Rate (IMR). The facilities provided would include provision for expert advices, vaccination alerts, tracking the baby's growth, alerting when to take actions and chatting / video conferencing facility with medical experts. A study was conducted to understand the effectiveness of mHealth in neonatal care and what people actually expect from such a system.

Keywords: mHealth, Neonatal care, infant mortality, mobile, IMR

I. Introduction

Infant mortality is the death of a child before her/his first birthday. It is an important indication of the overall health of the society. According to 2015 UNICEF report, India tops the list of countries where mortality of children under 5 is higher. In India, the under-five mortality rate (U5MR) is about seven times higher according to the reports. Though India did not qualify to meet the Millennium Development Goal (MDG) target of reducing the mortality by two-thirds over the period of 25 years, it has succeeded in achieving 62% reduction which is commendable considering the huge population of the country .But it still lags behind most of its neighbours including Bangladesh, Sri Lanka and Nepal. As per the findings 58% of under-5 deaths are caused during the neonatal period in India. Further efforts continue under India's plan to bring down the U5MR with its India New-born Action Plan (INAP) that was unveiled in 2014. This plan aims at bringing down the rate of neonatal and stillborn mortality. For an overall drop in child mortality, better vaccines, better primary healthcare facilities, improved nutrition, and excellent post-natal care are essential. Child mortality rates in India could be significantly reduced if simple lessons could be taught to new mothers as how to wrap new-borns to prevent exposure to cold, skin-to-skin care, birth preparedness and making sure they reached a hospital in time for medical care. The use of mobile technology can play a very important role in this scenario.

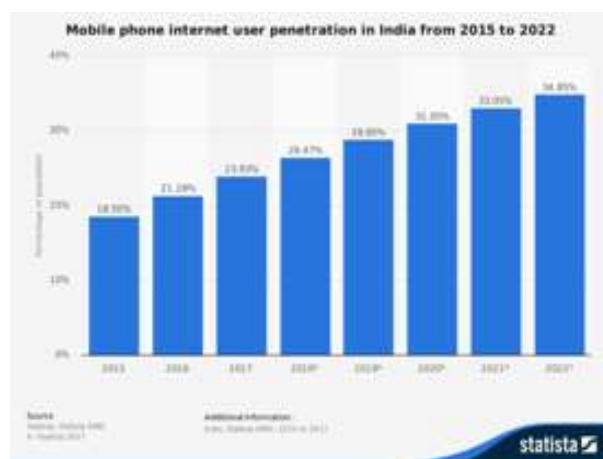
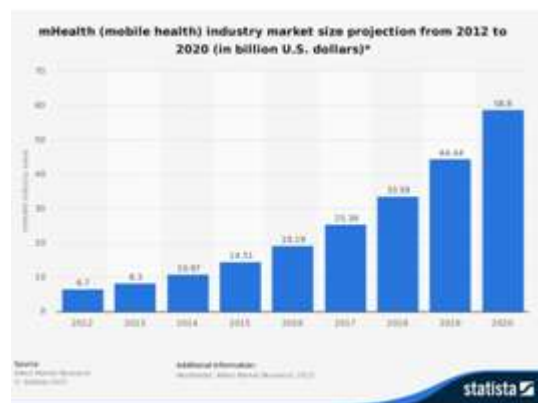


Fig 1. Projection of mHealth industry market size.

India's mobile phone subscriber base crossed the 1 billion user's mark, as per data released in 2016 by the country's telecom regulator. With many service providers coming up with competitive data plans mobile devices has become an easy means to connect to internet. The statistics as per Statista shown in Fig.1 gives information on the mobile internet penetration in India from 2015 to 2022. In 2017, about 24 % percent of the population accessed the internet from their mobile phone. This figure is expected to grow to 35 % percent in 2022. Growth in internet dissemination will have several significances, including delivery of financial and healthcare services as well as in eGovernance.

Over the past decade, mobile health, or mHealth, has developed as a cutting-edge tool for expanding access to health information and services around the world. mHealth uses mobile and wireless technologies, such as mobile phones, personal digital assistants (PDAs), patient monitoring devices, and mobile software applications to achieve health goals. The statistic shows a forecast regarding the value of the global mHealth market from 2012 to 2020. There is a steady increase in the number of mHealth apps downloaded worldwide and is expected still increase.

**Fig 2.** Mobile phone internet user penetration in India.

II. The Study

A survey based study was conducted to understand the effectiveness of the mHealth apps in neonatal care. A questionnaire was prepared to collect data from expectant mothers and mothers of new born babies. The first part of the questionnaire dealt with the personal data of the respondents. The second section was concerned with the expectations with the mHealth app. The survey was implemented in two ways. One by using google forms and another by using physical

questionnaires. The hardcopy questionnaire was circulated in two different languages one in Hindi and the other in English. This was done with the motive of gaining more number of respondents. There were about 100 respondents for online survey and 25 respondents for the physical local language questionnaire.

II.1 Survey Analysis

The responses generated varied from respondents of different age group and qualification levels. Majority of the respondents especially the online survey respondents were post graduates with a minimum rate of understanding about the survey topic. There were participants with +2 and degree level qualifications especially respondents from offline survey process. The respondents were of various age groups with the majority being in the age group of 20-25. Out of the 125 respondents about 50 % were employed and 100% were using smartphones. About 50% of the respondents were expectant mothers and others were mothers of new-borns.

About 41% had heard about mHealth apps and about 36% have been using different mHealth apps like Samsung Health.

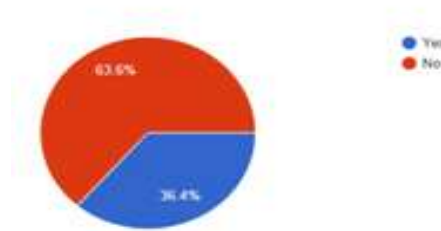


Fig 3. Approximately 36% respondents are using mHealth apps.

About 90% respondents were willing to receive medical advices via mobile phones. For the question whether they feel the need of a system to answer queries regarding their baby's growth anytime anywhere, about 92% responded positively.

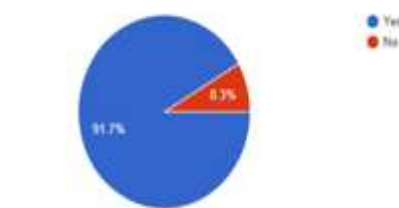


Fig 4. Approximately 92% respondents urged the need of a system to answer queries regarding their baby's growth anytime anywhere.

About 75% respondents were ready to register to mHealth app to track their baby's growth and connect to paediatrician. A list of possible features of such a mHealth app was enlisted in the questionnaire where they could select more than one option. They were as follows:

1. To fix appointments with the Paediatrician
2. Engage in two-way communication with Paediatrician
3. Reminders for medication and appointment.
4. Share medical records and reports with Paediatrician
5. Track child's growth by monthly weight gain and make possible diagnostic suggestions if needed
6. All the Above

75% respondents suggested that the app should contain all the features enlisted. Others selected 2-3 features from the list in random.

Apart from the enlisted features, provision was given in the questionnaire for the respondents to provide additional features that they expected from such a system. Many of the respondents listed out additional features enlisted as follows:

1. Tips to handle emergency situations
2. Vaccination Reminders.
3. Polio drive and other communal vaccination reminders
4. Month wise food plan for babies
5. Natural remedies for common diseases.
6. Care and handling tips especially for the first month of baby's life.
7. Month wise milestones to be achieved and signalling a required check-up if not achieved in stipulated time period.

III. Conclusions

The study gave a positive outcome on the importance of a system for neonatal care which comes as an aid anytime anywhere. Majority of the respondents were open to the idea of using a mHealth app for the same. Expectations from such an app became very clear from the study. Majority of respondents selected all the features enlisted in the questionnaire and in addition to it suggested extra features that they would be looking forward to in such an app. A system to be developed should meet all these expectations to be effective. The app could be an alternative method of communicating with one's pediatrician in case of emergency. The app should

be cloud based system with data pertaining to each infant registered being maintained separately. Personalized tips, notifications and messages would be sent to each registered infant. Facilities should be provided for the like minded parents to interact with one another and share their experiences. Information about community vaccination like that of Polio drives or similar need to be provided to all registered members as and when it is announced. If the system has to be implemented in a large scale a team of medical experts and pediatricians should be formed who would be ready to provide medical advices via mobile. It could be as a part of their social responsibility or on a profit basis. There would also be requirement of a group of administrators or coordinators to completely monitor the system. The app would be mainly designed for infants below one year of age. Parents can unregister the infant from the app as and when the infant crosses a year of age. All the data pertaining to the infant would then be completely removed from the system. Though the survey was performed in an urban area, the mHealth app developed would be a boon to rural area as they rarely have access to good pediatricians and medical experts. In cases where parents cannot afford for a smart phone or are not competent enough to operate on any mobile apps, community healthcare worker (CHW) could operate an infant's account on behalf of the infant's parents. But a smart phone with data plan is not a luxury. Nowadays even in rural area people have access to these gadgets. Only requirement would be that the app should be designed in regional languages to have massive usage. The interface design should be simple and user friendly. Prompt replies to the queries especially raised during emergency would be vital. So there needs to be mechanism to specify the importance of the query raised. A possible option would be to set three levels of queries like say low, medium and high. The importance or promptness of answering the questions can be as per the level of importance. High level queries needs to be considered as emergency and dealt with promptly. Video conferencing could be provided for emergency consultation as the medical expert will be able to analyze the baby through video.

At times a very simple step taken at the right time could save an infant's life. In this connected world, let connectivity itself help us achieve our goal of reducing Infant Mortality Rate to as minimum as possible.

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