

# Study of Concerns Related to Implementation of M-Health in India: Understanding Urban Doctor's Perspective

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## ABSTRACT

In this paper, we are concentrating on the fact that urban doctors are still facing certain issues which are supposed to be resolved by ever growing mobile technology & M-Health solutions in India. We are here trying to identify roots that are causing those concerns as well as we are trying to find their possible solutions.

## Keywords

M-Health, Indian Healthcare Industry, Urban Doctors, Healthcare Problems, Doctor's perspective, M-Health Implementation challenges.

## 1. INTRODUCTION

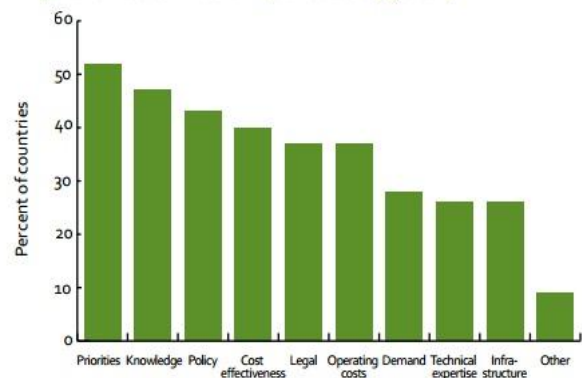
Technology has evolved rapidly over the past few years. Especially in last decade, a standard mobile device has gone from being calling device to Text Messenger, Handheld gaming device, Embedded Web Browser, GPS navigation device and now mobile computing with wireless networking [1]. With the introduction of mobile technology in India, There has been a tremendous growth in mobile users each year. According to an independent online survey, Total population of India is approximately 13 billion and 46% of which i.e. 590 millions uses mobile devices [5]. With so many active mobile users in India, it is very much possible to reach those users with the help of mobile technology. Many problems can be solved with the use of the mobile technology as in the past it was a difficult task to achieve the same and hence introduction of M-Health.

## 2. WHAT IS M-HEALTH?

M-Health is abbreviation for Mobile Health; a term means the practice of medicine and general well-being supported by mobile phones, tablets & PCs, for health services and information, but additionally to influence emotional state. The M-Health is a subset of E-Health [2]. M-Health applications include the use of mobile devices in gathering regional and clinical health data, producing healthcare related information to doctors, researchers, patients and other medical representative, real-time supervision of patient important signs and direct provision of care.[5]

## 3. M-HEALTH IMPLEMENTATION CHALLENGES

Figure. Barriers to mHealth implementation, globally



Above figure illustrates the cited barriers to M-Health implementation globally. The highest is conflicting health system priorities (52%) and also the lowest is underdeveloped infrastructure (26%). All known barriers, however, ought to be reviewed once considering the numerous factors that may impede M-Health adoption. [8]

### 3.1. Resistance to technological change:

In some cases, Doctor resists change. They become comfortable with the traditional way the treatment is done. They know the expectations and their role within the institute. When a major change disturbs their familiarity, some representatives become upset. They don't want to change the way they do things.

### 3.2. Availability Issues:

With introduction of M-Health solutions in Indian healthcare, a lot of applications were developed but quality and productivity of those applications is still questionable and also there is no proper way to rate those applications.

### 3.3. Information Overload:

Doctors and other medical representatives have access to

several screening and diagnostic tools. The amount of information from these tools can be large so sometimes it's not easy to collect, interpret and extract information from that data so as to make life saving decisions.

#### 3.4. Self-diagnosis & treatment by patients:

With the help of internet, many patients search for diagnosis information related to their disease according to symptoms they diagnose themselves. While doing so mostly they find themselves on websites such as Wikipedia and WebMD which are valuable and usually accurate in terms of Information published on that site

But self-diagnosis is an unprofessional activity and is potentially dangerous interpretation of disease symptoms. Many patients typically diagnose symptoms of their diseases incorrectly, which may cause a false diagnosing. This can result in a fatal illness being misdiagnosed. Further increasing the situation, some treatment options may not be feasible for some patients, and can endanger their health. [4]

#### 3.5. Conflicting treatment plans with self-educated patients:

A Doctor-patient interaction becomes incapacitated when patients self-diagnose themselves. Some patients blindly trust information found on internet more than that provided by a doctor. Some patients will verify, checks all the facts and treatment options or diagnoses provided on internet, without understanding the full process behind the diagnosis then they compare it with treatment option or diagnosis provided by the doctor. This creates conflicts between patient and doctor, which lead to lapse in treatment and sometimes failure in further schedule follow-up visits.

#### 3.6. Liability in treatment through online doctor reviews:

Many doctors are finding themselves reviewed and recommended by existing patients. There are several prominent websites on the internet that allow patients to review individual doctors, and rate them on their effectiveness. Referring this website reviews, new patients visits those highly rated doctors in their area but still some doctors are not keen to use these website to do their branding and they are happy with their current reputation. There is one more problem with this kind of websites sometimes they falsify doctor's rating or make user to falsify particular doctor's rating for their own benefit as well as for doctor's benefits. There is no way to ensure that rating and reviews are legitimate.

#### 3.7. Underdeveloped Medical Devices Sector:

Though medical devices segment is the smallest part of India's healthcare industry, it is one of the fastest-growing areas in India. Till date, the industry has faced numerous regulative difficulties which have kept its development and improvement. Recently, the Indian government has successfully implemented regulatory which is suitable for trading medical devices, and also introduced a few standards around clinical disputes. Foreign and Regional investors also has welcomed for investment as this sector has lots of potential for future developments as well as is highly profitable and always is on demand as observed earlier in other countries. [4]

#### 3.8. Security:

Every new technology creates new vulnerabilities and a different set of security risks. Every health care institute has to face contingencies like cyber-attacks, power outages, rapid increases in traffic or network demands, and losses of Internet

connectivity. To successfully implement new technology every aspects of that technology need to be understood which is sometimes is a very difficult task [4]. Data security may be a significantly vital issue to deal with among the world of policy. There are legitimate Concerns regarding the safety of subject information by programs using mobile health technologies. In Particular, message transmission security and information storage security will place subject information in danger if the necessary precautions aren't taken. Security policies secure health identity information throughout the entire information life cycle – from the primary input of patient information using the mobile device to follow-up through a post-surgery survey. Parameters like password protection, network log on requirements, synchronization of files to the device, and backup and recovery and applications installed need to be evaluated and outlined as part of the mobile security policy. It's conjointly essential for devices to possess antivirus and firewall capabilities to prevent information loss or infection. Policy-makers and program managers got to be made responsive to security issues within the M-Health domain therefore applicable policies and techniques will be developed and enforced.[8]

#### 3.9. Training:

If medical representatives are not prepared to operate and take full advantage of new resources, implementing new technology can be inimical so it's necessary to give them training and hands on newly implemented technology to medical representatives prior to actual system goes online.

## 4. CURRENT USE OF M-HEALTH IN INDIA

India has one of the largest health care burdens in the world, due to a limited endowment of doctors per head, a high rural population which cannot simply access specialists and a significant communicable disease burden. To fulfill such a humongous demand Indian government has already started implementation of M-Health knowing its potential to reach a mass and to serve them with more robust system and that to cost effectively. Indian Government has shifted their perspective from only E-Health Implementation to E-Health Implementation along with M-Health Implementation across the country. Indian Government reviews their current health policies and acknowledged that there are 3 themes that can be paid attention to make M-Health increasingly relevant for India:

- 4.1. With emergence of mobile phones, traditional computers and tablets which are progressively operating along with back-end technology support to boost supply as well as lower operational prices and, huge potential savings to capital expenditure in building a lot of and a lot of hospitals and clinics. Smartphone uptake will surpass two hundred million at intervals a couple of years and the general public's usage of information on mobile devices is increasing.
- 4.2. M-Health is reducing readmission rates in chronic patients (e.g. those with kind II diabetes) through higher observance and higher compliance rates for prescribed care. Regular check-ups can simply be industrialized through remote monitoring using mobile, interpreted by information analytics at the health clinic.
- 4.3. M-Health provides the potential to generate invaluable societal data, provided there is a typical

and acceptable framework to host and share the information responsibly. For public health policy development in India, the benefits of a program to gather data more systematically through mobile are immeasurable.[9]

Following are the some of the initiatives taken by Government under Digital India program, intended at leveraging India's increasing mobile phone penetration.

- Kilkari
- Mobile Academy
- M-Cessation
- TB Missed Call Initiative [10]

But knowing only Government's perspective is not sufficient. Doctor's point of view also needs to be considered on same as not only they are ones which are dealing with this change on daily basis but also they plays major role in strengthening the public health domain.

## 5. METHODOLOGY

The study made use of the survey approach for gathering of information for which various Doctors in urban areas were visited. It was decided to select respondents from urban areas of the country because they have easy access to those technologies still they are not able to use the full potential of those technologies. A well defined questionnaire having subjective and objective questions was designed. The questions were asked to them one by one at a time and their responses were recorded. Our basic objective was to find out the liability and the severity of the challenges discussed earlier. There were both positive as well as negative replies from the doctors. Their views are collected and recorded, both in objective and subjective way because intention is getting their reactions to the level where they being real user of mobile technology, give their current input as per the experience and recorded their expectations from ever growing mobile technology in order to resolve the current issues they are facing.

## 6. RESULTS

### 6.1. Questionnaires Along With Pie Charts And Tables

#### 6.1.1 Gender:

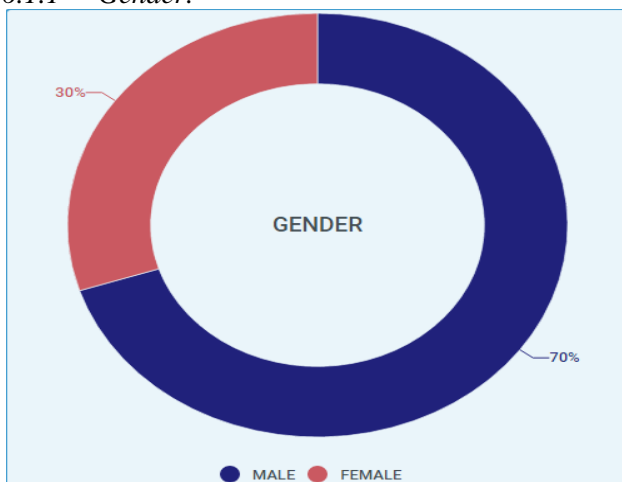


Fig. 1. Respondent based on Gender.

Table 1. Respondent based on Gender

Male	70%
Female	30%

From total number of respondents, 70% are Male Doctors while 30% are Female Doctors.

#### 6.1.1. Age

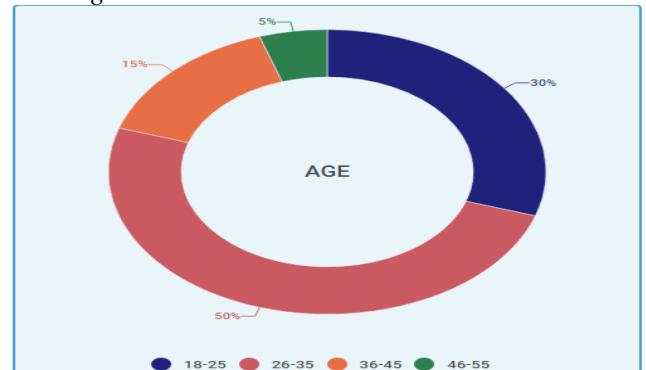


Fig. 2. Respondent based on Age.

Table 2. Respondent based on age

18-25	30%
26-35	50%
36-45	15%
46-55	5%

From the total number of respondents, 50% Doctors are aged between 26-35 years, whereas 30% are aged between 18-25 years, whereas 15% are aged between 36-45 years and rests i.e. 5% are aged between 46 and above.

#### 6.1.3 Role

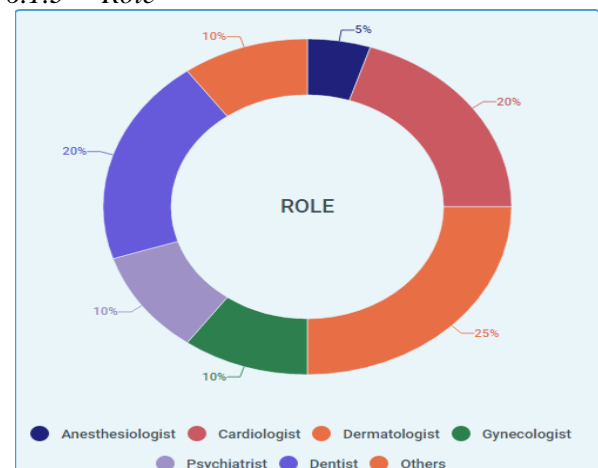


Fig. 3. Respondent based on Role.

Table 3. Respondent based on Role

Anesthesiologist	5%
Cardiologist	20%
Dermatologist	25%
Gynecologist	10%

Psychiatrist	10%
Dentist	20%
Others	10%

From the total number of respondents, 25% Doctors are Dermatologist, whereas 20% are seen Cardiologist as well as Dentist, whereas 10% are seen Gynecologist, Psychiatrist or other roles and rest i.e. 5% are Anesthesiologist.

6.1.4 No. of patient's visit per day:

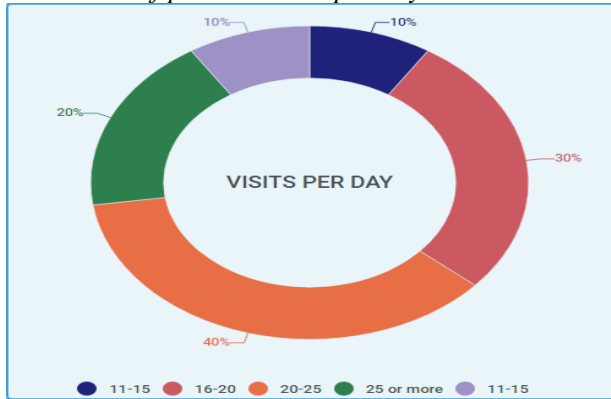


Fig. 4. No. of patient's visit per day.

Table 4. No. of patient's visit per day

11-15	10%
16-20	30%
20-25	40%
25 or more	20%

From the total number of respondents, 40% Doctors visits 20-25 patients per day, whereas 30% Doctors visits 16-20 patients per day, whereas 20% Doctors visits more than 25 patients per day and rest i.e. 10% Doctors visits 11-15 patients per day.

6.1.5 Consultation time per Patient:

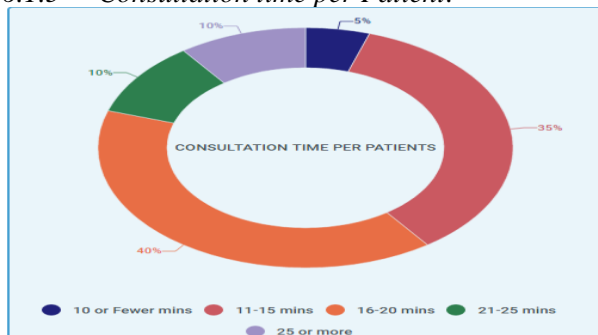


Fig. 5. Consultation time per Patient.

Table 5. Consultation time per patient

10 or Fewer mins	5%
11-15 mins	35%
16-20 mins	40%
21-25 mins	10%

25 or more	10%
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From the total number of respondents, 40% Doctors takes 16-20 minutes consultation time per patients, whereas 35 % Doctors takes 11-15 minutes consultation time per patients whereas 10% Doctors takes 21-25 minutes consultation time per patients and rest i.e. 5% Doctors takes 10 or fewer minutes consultation time per patients

6.1.6 Smartphone Owner:

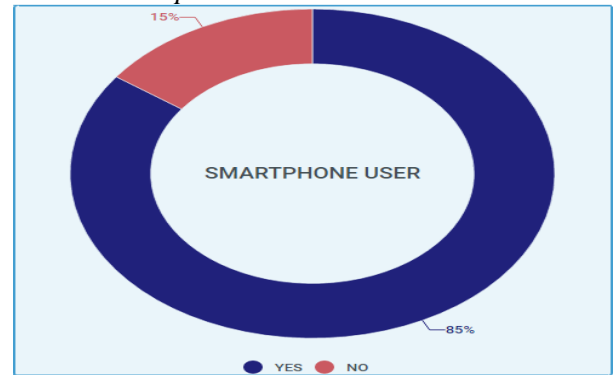


Fig. 6. Smartphone Owner.

Table 6. Smartphone Owner

YES	85%
NO	15%

From total number of respondents, 85% Doctors are Smartphone owner while rests i.e. 15% are not Smartphone owner.

6.1.7 Internet Connectivity trend among respondent

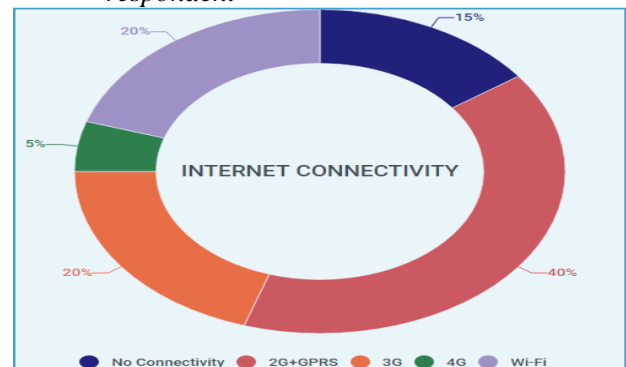


Fig. 7. Internet Connectivity trend among respondent

Table 7. Internet Connectivity trend among respondent

No Connectivity	15%
2G+GPRS	40%
3G	20%
4G	5%
Wi-Fi	20%

From the total number of respondents, 40% Doctors uses 2G+GPRS for internet connectivity in their smart phones, 20% Doctors are seen using Wi-Fi as well as 3G for internet connectivity in their smart phones, 5% Doctors uses 4G for internet connectivity in their smart phones and rest i.e. 15%

Doctors has no internet connectivity in their smart phones.

### 6.1.8 Count of Internet Usage Per Day

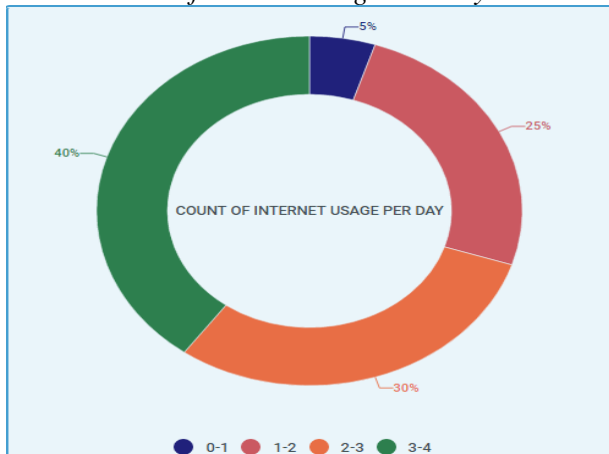


Fig. 8. Count of Internet usage per day

Table 8. Count of Internet Usage per day

0-1	5%
1-2	25%
2-3	30%
3-4	40%

From the total number of respondents, 40% Doctors uses internet from their smart phones 3-4 times per day, 30% Doctors uses internet from their smart phones 2-3 times per day, 25% Doctors uses internet from their smart phones couple of times per day & rest i.e. 5% Doctors hardly uses internet from their smart phones.

### 6.1.9 Purpose of Internet usage

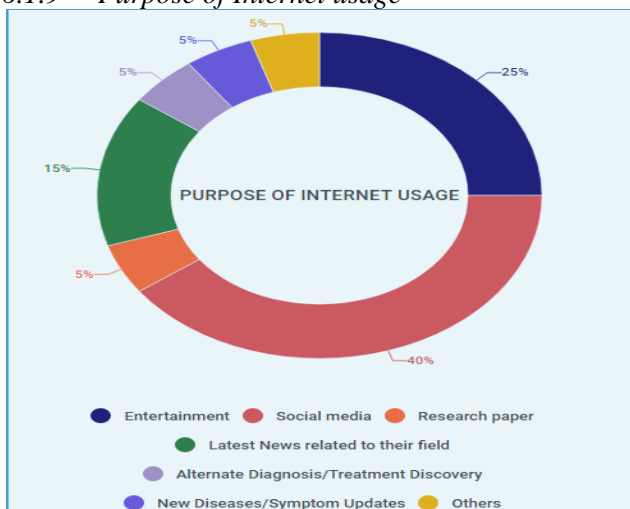


Fig. 9. Purpose of Internet usage

Table 9. purpose of Internet usage

Entertainment	25%
Social media	40%
Research paper	5%
Latest News related to their field	15%

Alternate Diagnosis/Treatment Discovery	5%
New Diseases/Symptom Updates	5%
Others	5%

From the total number of respondents, 40% Doctors uses internet for Social media usage, 15% Doctors uses internet to obtain Latest News related to their field & rest Doctors uses internet for Research purpose, discovering alternative Diagnosis/Treatment techniques, updating themselves about new Diseases/Symptoms of diseases and other purposes.

### 6.1.10 Application usage for Doctor-Patient Interaction

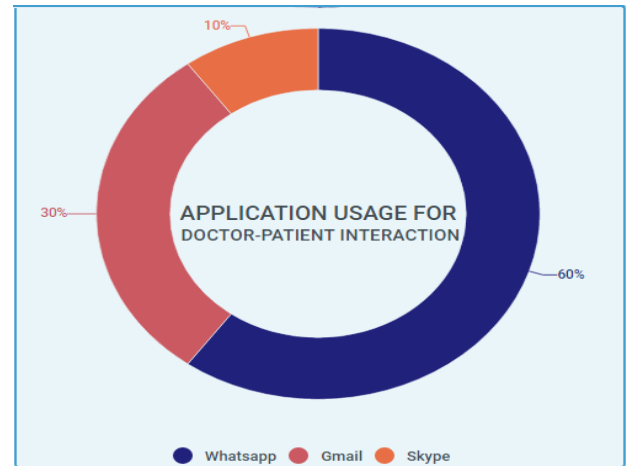


Fig. 10. Application usage for Doctor-Patient Interaction

Table 10. Application usage for doctor-patient interaction

Whatsapp	60%
Gmail	30%
Skype	10%

From the total number of respondents, 60% Doctors uses whatsapp or any other chat application for Doctor-Patient Interaction, 30% Doctors uses Gmail or any other email service provider for Doctor-Patient Interaction & rest 10% Doctors uses Skype or video calling service provider for Doctor-Patient Interaction.

### 6.1.11 Problem Area with M-Health according to Respondent

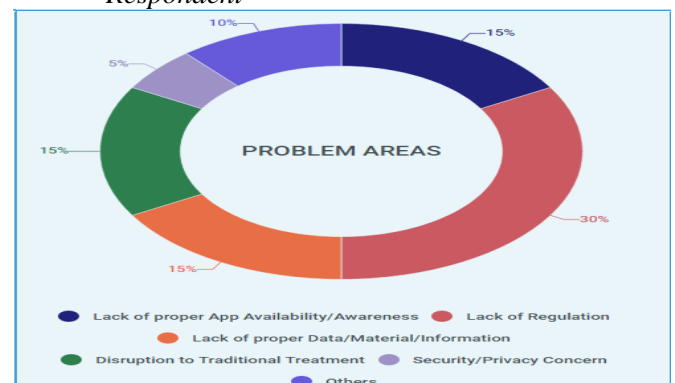


Fig. 11. Problem Area with M-Health according to Respondent

**Table 11. Problem area with m-health according to respondent**

Lack of proper App Availability/Awareness	15%
Lack of Regulation	30%
Lack of proper Data/Material/Information	15%
Disruption to Traditional Treatment	15%
Security/Privacy Concern	5%
Others	10%

From the total number of respondents, 30% Doctors thinks there is lack of regulation, 5% Doctors think there is security/privacy related issues, 15% Doctors thinks for each of the following reason as a barrier to M-Health Implementation

- Lack of proper App Availability/Awareness
- Lack of proper Data/Material/Information
- Disruption to Traditional Treatment

## 6.2 Overall Analysis:

▲ 85%

Doctors owns smartphone

▼ 65%

Doctors uses smartphone for entertainment purpose

**Fig. 12. Analysis 1**

▲ 60%

Doctors uses Messenger app (Whatsapp) for Doctor-Patient Interaction.

▼ 60%

Doctors thinks that there is Awareness, Regulation and Availability related Issues with M-health Solution.

**Fig. 13. Analysis 2**

▲ 7

hours/day doctors consults their patients

▼ >4

hours/day Doctors uses their smartphone.

**Fig. 14. Analysis 3**

## 7 SUGGESTIONS

After analyzing the result of obtained information from urban doctors, it is understood there is still scope of improvement while implementing M-Health across the country and following are some of the suggestions which are needs to be considered.

- 7.1. *Create a Platform:* There is need to create a platform and provide a framework with common efforts of private as well as public sector upon which m-Health solutions can be developed under open source environment.
- 7.2. *Make Potential use of Mobile Technology:* It is found out that mobile technology has lots of potential to resolve

current issues which are exist in this area but it is still not resolved simply because mobile technology is not fully utilized in this area.

- 7.3. *Machine learning feature:* With these feature on, mobile solution can make effective and efficient decision making with or without help of prehistoric patient data or previous patient cases/experiences

- 7.4. *Improving level of Doctor-Patient interaction:*

### 7.4.1 Text Messaging:

One-way	Two-way
-Appointment Reminders -Treatment Reminders -Health Promotion -Epidemic/Emergency Alerts -Surveillance	-Appointment confirmations -Patient Records -Treatment Compliance -Patient Diagnosis

### 7.4.2 Voice Services:

One-way	Two-way
-Automated health information lines -Health Promotion -Epidemic/Emergency Alerts -Surveillance	-Health call centers/Hot-lines -Emergency toll-free lines -Mobile Telemedicine -Patient monitoring

### 7.4.3 Voice+Video Services:

One-way	Two-way
- Remote Treatment	-Mobile Tele-medicine -Emergency Services

### 7.4.4 Internet connection:

One-way	Two-way
- Remote Treatment	-Mobile Tele-medicine -Emergency Services

- 7.5. *Including multilingual features in M-Health solutions:* Adding a multilingual feature, so if one doesn't know about the required language can still communicate smoothly, this solution was comparatively feasible for the first but yet not applicable in learning a language in its entirety.

- 7.6. *Use of text-to-speech:* Using this technology in Mobile application would certainly avoid the problems altogether.

These were the temporary solutions which would be effective until the real nature of the problem. On in all, there are still many people who were either unaware of these latest apps or even after knowing was not using them. People's life has got great effects of technology and it all depends on how the technology is being used. If people use the technology in the negative way, then it is the most harmful way of human life. And if people use it for the welfare of the society, then it can prove to be a boon to mankind. [3]

Technology has helped in increasing the speed of communication and decreasing its cost. However, at the same time it has even caused people to become more impersonal with each other.

Another thing is that, Clinicians ought to be mindful of the basic plausibility of a wrong or missed diagnosis as a result of

the loss of information during transmission or as of low quality of digitalized images transmitted through a mobile device or utilizing a mobile phone.

Standards for different aspects of M-Health, clear rules with respect to operational methodology, well-defined responsibilities for individual stakeholders-and systems to observe, forestall, and punish examples of carelessness, fraud, and misuse- must be drawn up and implemented. Exploiting capabilities to the fullest furthermore, overcoming confinements in an operational setting ought to be a part of the agenda of any M-Health system.

To accomplish consistent availability and universal access, it is important to establish a critical review of various innovations that can be utilized as a part of the setting of a creating a nation, stressing on its points of interest, detriments and restrictions. [7]

Literature on M-Health implementations is still dominated by studies of pilot projects and people enforced to run a brief amount, dealing with specific problems. This could probably be a sign of what's happening on the bottom i.e. most M-Health projects area unit pilots with no clear strategy on however they will be up scaled. There is a desire to analyze implementation strategies, best practices and the effectiveness of M-Health on large-scale implementations. We argue that the social impact of M-Health interventions might go on the far side the health indicators into different social areas. For improved effectiveness of M-Health, there is a desire for changes in both the follow and therefore the analysis of M-Health. Practically, the bottom-up innovations of health staff ought to be inspired in M-Health implementation, so that all stakeholders, including deprived communities, can contribute to the method of realizing desired health outcomes and well-being.

Such a process might conjointly empower people and communities, leading to social change and improved quality of life. [11]

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