

Screening of Patients using mHealth in Primary Health Centre at Gadchiroli

By

Sakshi Sharma

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management*

Academic year, 2018-2020



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During : 10th Feb to 10th May 2020

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She comes across as a committed, sincere & diligent person who has a
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This is to certify that the dissertation titled Screening of Patients using mHealth in Primary Health Centre at Gadchiroli and Submitted by Sakshi Sharma Enrollment No 0148 under the supervision of Mr. Rahul Sharma for award of MBA in Pharmaceutical Management of the IIHMR University carried out during the period from 10 February to 10 May 2020 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute pr other similar institution of higher learning.

Sakshi Sharma

Signature

ACKNOWLEDGEMENT

I take this opportunity with pride and enormous gratification to express gratitude from the core of my heart to all individual who abided with us directly and indirectly throughout the learn lush phases during the materialization of this Project.

At the very commencement, with great veneration and immense glee to express my deep sense of admiration to our adorable guide MR. Rahul Sharma, Assist. Professor Department of Pharmaceutical Management, whose immeasurable espouse, encouragement and affirmative criticism and providing all the necessary facilities for the completion and has given full bloom to this research work.

With great pleasure I express my most cordial, humble and gratefull thanks to Mr. Yk Gauba , Director India for giving opportunity to do my research work and also for inspiration and valuable suggestions.

I sincerely extend my gratitude to all the faculty members of department of Pharmaceutical Management for their timely help and suggestions during this course of Dissertation..

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ORGANIZATION PROFILE:

Mutelcor GmbH is a privately held consulting group with its headquarters in Dusseldorf (Germany) and regional offices in Amsterdam and New Delhi. Founded in 2008, Mutelcor has successfully helped the network operators to transition smoothly to intelligent – future proof networks. The company's end to end capabilities in the areas of telecom, strategy, technology, and project management it has enabled operators reshape their telecom business to meet ever evolving future digital demands.

It is a bunch of vendor independent technology mavericks with a strong global presence with more than 20 years of experience in the areas of core, messaging and VAS across Europe, Africa and Asia.

Mutelcor's Digital Health solutions have been thoughtfully curated in consultation with several healthcare industry experts with a sole aim to add a unique mobile dimension to your existing clinical workflows simplifying monitoring and management of patients with chronic health conditions. Mutelcor's diverse product range includes condition customized applications for pre and post-op bariatric and cardiac care, diabetes condition management, Hypertension, CKD, and rural healthcare all on a single platform that entails Patient Mobile App, Doctor Web Portal and Intelligent Patient Data Analytics.

INTRODUCTION:

Mutelcor mHealth team conducted 'mHealth for rural citizens' trial in a Primary Health Centre in Maharashtra, India to underline a benefit of mHealth in rural health centres where there is a shortage of Primary Care Physicians and to provide the public healthcare centre staff an experience of mHealth technology. During this experiment the diagnosis of patients in PHC were done by a doctor who was present in a hospital located in a district nearby using mobile Health application, portal and connected devices to provide consultation instantly.

Wellbeing Ministry of India is confronting greatest obstacle for Rural Health care. Over 70% of India's populace living in provincial zones. The wellbeing offices levels are low which prompts high death rates because of infections in this portion of Indian populace. (Health in India, 2016)

Maharashtra's general wellbeing framework comprises of about 1,200 essential wellbeing places (PHCs), 387 provincial and 81 sub-locale clinics (RH and SDH) and 23 area common medical clinics (Bang, 2020).

Shortage of infrastructure, scantiness of qualified clinical functionaries and inaccessibility to proper medication obstructs the reach of healthcare to 60% of the population of India. The majority of Indian population living in rural areas where the state of medical management is unpardonable. In view of the shabby healthcare conditions in rural areas, there is a dire need of implementation of new practices and methods to ensure that suitable healthcare extends up to the underprivileged Indian villages. Government has introduced a lot of new schemes to improve the healthcare situations of rural people but the success of these policies is doubtful and uncertain. In provincial regions where the quantity of PHCs is now restricted, 8% of the focuses don't have specialists or clinical staff, 39% don't have lab experts and 18% Primary Health Centres don't have a drug specialist.

Therefore, a change is must in this situation of rural health in India. This is what this project aimed to achieve using digital technology's help. (Rural Health Care: Towards a Healthy Rural India, 2014)

Digital technology is enquiring eminence in healthcare industry of India due to effort from both Public and Private sector. Initiatives launched by government such as Digital India and Aadhar have also helped in the healthcare sector's emergence. Creating mobile apps, setting

up innovation centres and adopting telemedicine are a few amongst the many measures taken by private sector. Digital health start-ups have largely influenced these initiatives.

mHealth technology refers the issue of doctor inaccessibility in the Primary Health Centres as it not only connects the doctors and patients remotely but also uses mHealth devices for diagnosis of the patient's health. A few other benefits of mhealth technology:

- Timely treatment can save a fatal health event.
- Patients can acquire master clinical consideration, setting aside both time and money
- Prevents overcrowding of District Hospitals by reducing visits.
- With the help of adequate training on mHealth solution to health workers, district hospitals, as well as mobile clinics, 'Health for all' dream can be a living reality in near future.

Workflow of mHealth solution: The patient goes to the nearby PHC where nurses take measurements of the vital parameters of the patient using mhealth devices and send it to the Doctor's web portal real time. Doctor then reviews the data of patient's symptoms and prescribes the medicines to the patients.

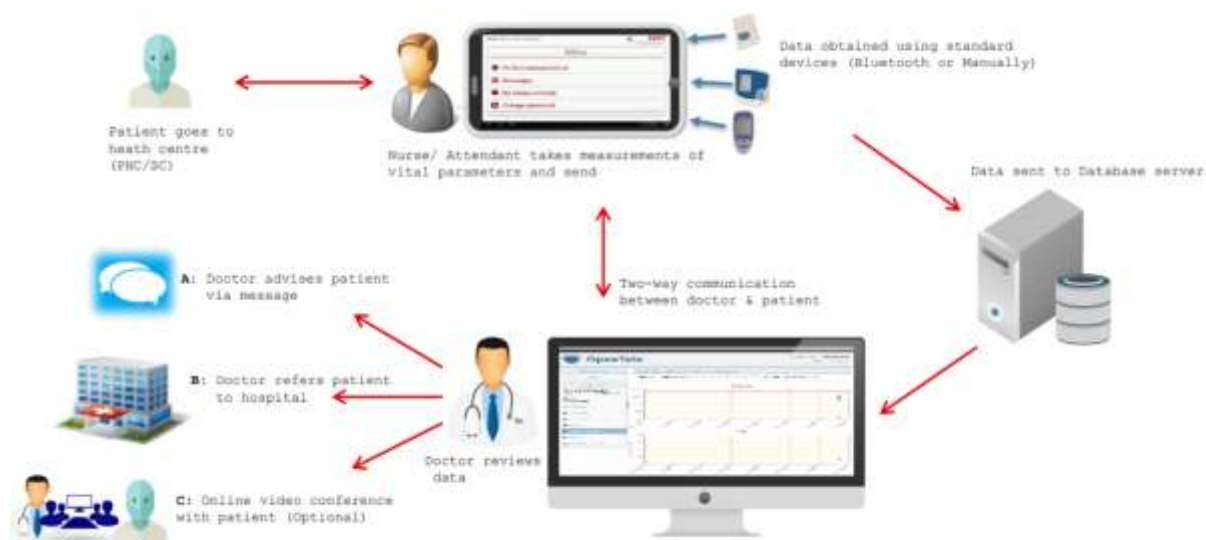


Figure 1 From the Mutelcor

Developing nations like India still facing the healthcare related challenges like limited transportation, scarcity of Healthcare practitioners, non-access to

medical facilities and limited infrastructure. mHealth technology connects rural health centres remotely to district city hospitals precisely predicting that mHealth is a sure cure to solve the very basic systemic healthcare delivery issues. Rural mHealth bridges the doctor-patient gap enabling patients in rural areas to access quality care along with proper and timely treatment. It includes a mobile app for healthworkers/nurses, connected diagnostics device, a kit and a dedicated web portal for doctors to provide consultation instantly.

LITERATURE REVIEW:

The rural population has less usage of electronic technologies than its urban counterpart. There is an urgent requirement of digital health technology in the rural setting.

Healthcare tools which should be included are

- Computerized patient data
- Email correspondence among clinicians and patients
- Remote language and social deciphering
- Telemedicine
- Remote patient monitoring of patient at home (e campus Rural health , 2019)

According to the Economic Survey 2018-19, tabled in the Parliament on July 4, 2019, 60% of primary health centres (PHCs) in India have only 1 doctor while 5% do not have any doctors. (Kaur, 2019)

The survey states that the PHCs has just one doctor or none show higher rural Infant mortality rates and maternal mortality ratio. The revelation which was more disturbing than the shortage of doctors was the careless behaviour of the PHC staff. Although this data was unable to reveal was the staff's irresponsible attitude because of absence of clinical supplies, poor framework and absence of observing of staff.

Only 20% PHCs are complied with Indian Public Health Standards (IPHS), the Survey said.

IPHS was introduced by the National Rural Health Mission (NRHM) in 2007 to upgrade the quality of healthcare delivery on the basis of infrastructure and human resource. (Indian Public Health Standards, 2020)

Although the government seems to pay attention to healthcare services in India, on the basis of this latest survey, healthcare in rural India continues to remain a matter of concern.

As per National Rural Health Mission Report:

- million individuals live in 636000 Indian rustic Villages.
- Majority of the rustic individuals bite the dust because of preventable and treatable illnesses like looseness of the bowels, measles and typhoid.

- 66% of rustic Indians don't have the entrance to meds.
- 31% of Indian populace voyages in excess of 30 kms to look for social insurance in country India. Gadchiroli

Gadchiroli district is located on the eastern side of Maharashtra, bordering Chhattisgarh in the East and Telangana in the South. Gadchiroli is one of the poorest and least developed districts of India. While rest of the Maharashtra and India is developing and flourishing, Gadchiroli district with nearly one million population, 36% of which is tribal, is lagging behind in various parameters of human development index. People already suffering from poverty, illiteracy, backwardness are further handicapped by the plethora of diseases such as malaria, sickle cell anaemia, malnutrition, childhood mortality, anaemia, tuberculosis, snake bites, and non-communicable diseases like hypertension, diabetes, back pain and stroke. The government health system is unsuitable because of thin population density and tribal population's doubt on public and modern healthcare. Reluctance of the doctors and the health service staff to work in the district is a major issue.(Gadchiroli district, 2019)

The Problems

A majority of people in rural India turn to the local health services available near them as their first choice of care due to lack to doctors and low quality of health care services around them. Viewing the healthcare survey of India, 92% of health care visits are to private doctors out of which 70 percent is urban population. However, private healthcare is very expensive, variable in quality and often unregulated. Also, private services seem unreliable for the illiterate and it is also unaffordable by low income rural folks.

Exceptional consideration should be laid on the medicinal services circumstance in rustic regions to forestall and control the spread of ailments and diminish the developing paces of mortality attributable to absence of sufficient wellbeing offices. The chief difficulties in the social insurance part are low quality of care, absence of mindfulness, low responsibility, and restricted access to office Technology for Rural Health Care

Mobile health apps and devices can be used by doctors and patients to better manage their health, especially in lifestyle diseases like diabetes, cardiac, and obesity. Mobile health benefits are not only restricted to patients but also for healthy people for wellness tracking (Ventola, 2014).

mHealth

mHealth is an effective possibility where distance is a concern. It helps in better lifestyle management for corporate executives by tracking and keeping health data automatically. mHealth is highly useful for defence personnel posted at remote areas. Mobile health sensors like glucometer, weighing scales, SPO2 monitors, blood pressure apparatus, activity trackers, ECG, and pedometers allow the user to automatically and wirelessly transmit the measured vital sign parameters to the patient's smartphone and then automatically transfer the data to secure database by means of secure internet. Data can be retrieved by logging in with user-ID and password, the entire transfer process takes place automatically instantaneously, without any action by the user. Summing up, the idea of mHealth is to reduce the healthcare expenses as well as travel inconvenience while assuring a quality care of patient.

Nowadays, more Indians are using their smartphones and broadband Internet to procure basic necessities such as food, clothes and healthcare. India's flourishing entrepreneurial and start-up culture is enhancing the use of this technology. India is the 3rd most flourishing middle-income economy according to the Global Innovation Index, 2019. The Start-up initiative has been seeking the attention of public sector's investment in this culture, thus, adding to this interest. The digital drivers have promoted a more turbulent, engaged and digitalised India. India's growing economy has been a long-standing indicator that has helped navigate this digital transformation.

The developments in the Indian healthcare sector have surged the necessity of tackling these disputes. Some of the significant trends are value-vs-volume driven healthcare, soaring digital integration and more patient-focused care.

A digital strategy ensures augmented and sustainable access to services for everybody. Therefore, a digital strategy can be applied in healthcare. Technology will lead to the progress of healthcare situation and improve patient care.

M-health is the largest sector within digital healthcare in India..Also, acceptance of m-health is surging rapidly. A study depicted that 68 percent of doctors in blossoming health market advocate m-health and 59% of patients are already benefitting from it. Mobile apps which connect doctors to patients and enable online consultations, are an important sector of m-health. (Thadvani, 2016)

OBJECTIVES OF THE STUDY:

The following objectives have been formulated during the study:

- To assess the attitude of rural people to accept mHealth technology.
- To understand barriers for reach of quality healthcare in rural population.
- To assess the feasibility of mobile health technology in rural population.
- To estimate or understand the market value of Remote patient monitoring in rural areas.

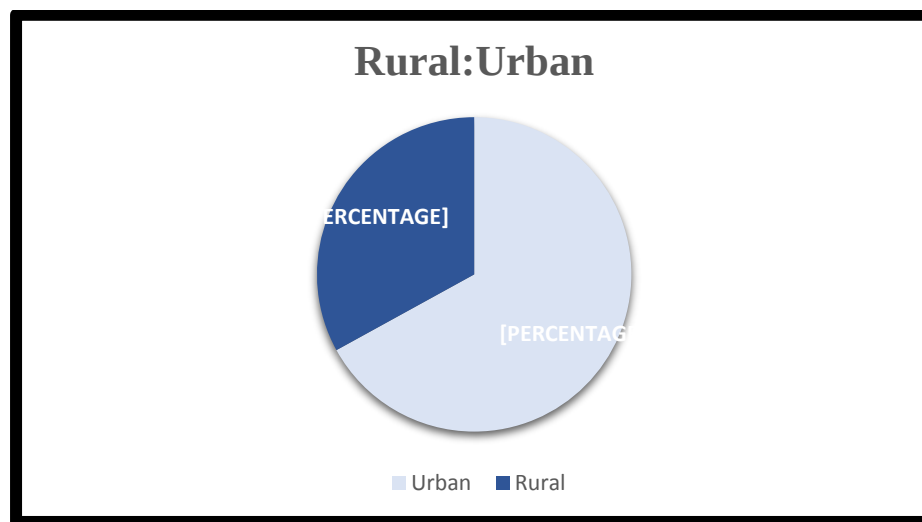
RESEARCH METHODOLOGY

Study Type	Descriptive Study
Data Type	Primary and Secondary Data
Sampling Technique	Non-Probabilistic Purposive Sampling
Duration	3 months
Sampling Area	Gadchiroli, Maharashtra
Sample Size	300 patients.

FINDINGS & INTERPRETATION

A team went to Gadchiroli district to conduct this PSC screening using mHealth. 300 patients were tested using non-invasive devices and prescription was generated using the Remote Patient Monitoring (RPM) solution. The volunteer patients were then diagnosed using mHealth technology. The data collected was then filed and the findings given below were discovered.

A) Doctor availability Rural: Urban



INTERPRETATION: The shortage of doctors in rural areas as in contrast to the no. of doctors in urban areas is massive in India. Among India Rural areas having only a 33% of doctors positioned while 67% of doctors positioned in Urban India, In terms of numbers only 29,562 of India's 1,06,613 government doctors work in rural areas although, the population in rural areas is more.

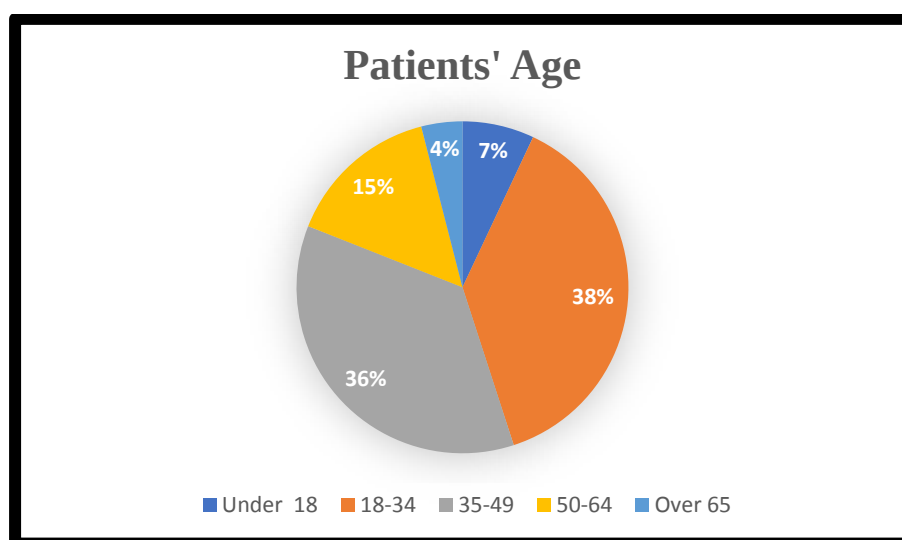
(Thadvani, 2016)

B) Split of doctor, Nurses per 1000 population.

INTERPRETATION: There are 0.7 number of Doctors per 1000 population and 1.3 Nurses per 1000 population. There is shortage of qualified doctors and nurses in India. So, India needs mhealth like technology to meet the deficiency. So, the doctors sitting in cities can see the patients of rural by using this technology.

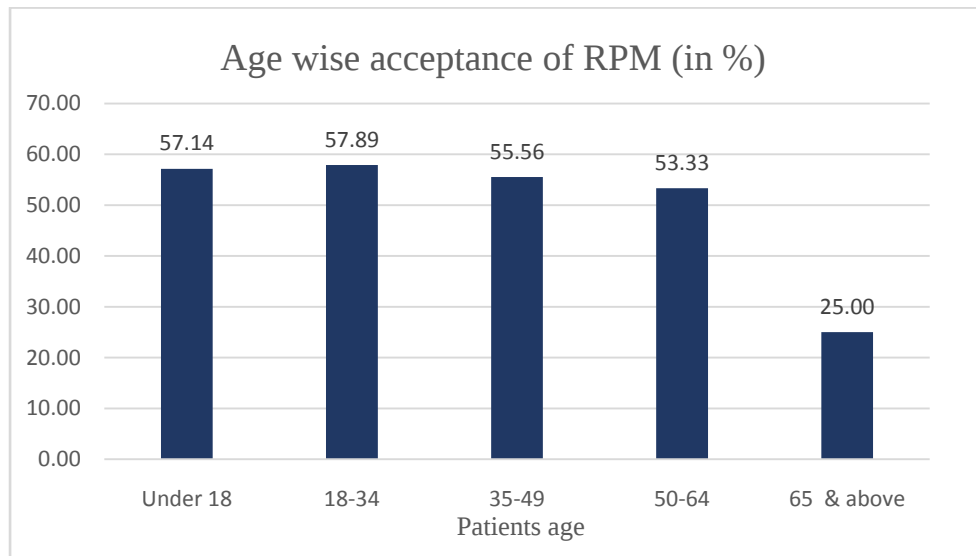
(How mhealth can revolutionise the Indian healthcare Industry, 2017)

C) Patients differentiation on the basis of their age



INTERPRETATION: The above pie chart represents the differentiation amongst the ages of the 300 patients so that we can understand that which age people are accepting remote patient monitoring easily. It shows that 7% patients fall in the under 18 age (12-18), 38% fall under 18-34 age group, 36% fall under the age group of 35-49 and 15% are fall under 50-64 age group. Only 4% fall in over 65 age group because they were not easily ready to accept digital technology.

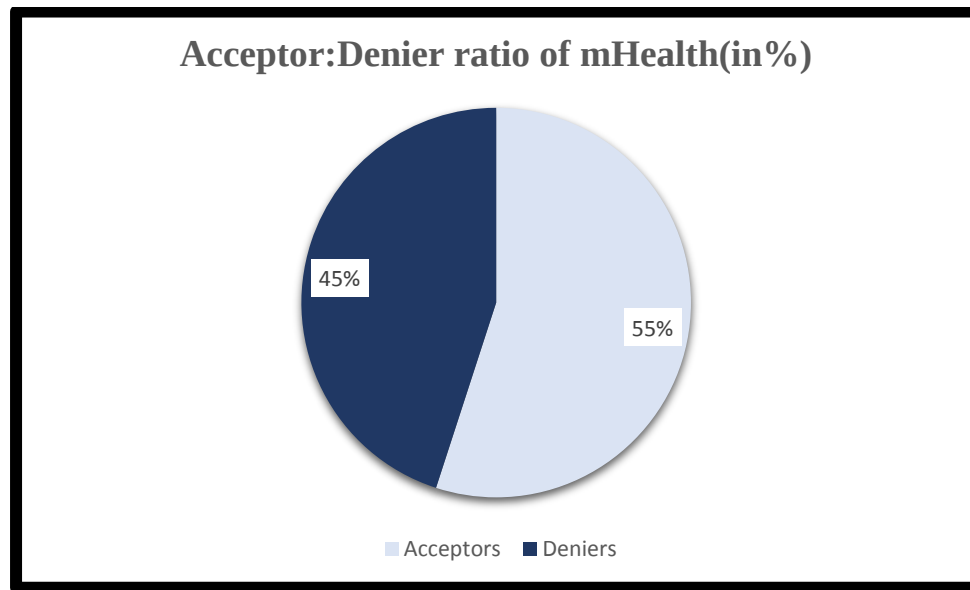
D). Acceptance of Remote Patient Monitoring by patients depending on their age.



INTERPRETATION: The above Bar graph shows the result of survey that 57.14% proportion of the patients which fall in under 18 years accepted and were willing to adopt this digital technology. 57.89% patients of 18-34 age, 55.56% patients under 35-49 age and 53.33% patients under 50-64 age approved Remote Patient Monitoring. But only 25% patients of 65 and above age accepted this mHealth solution.

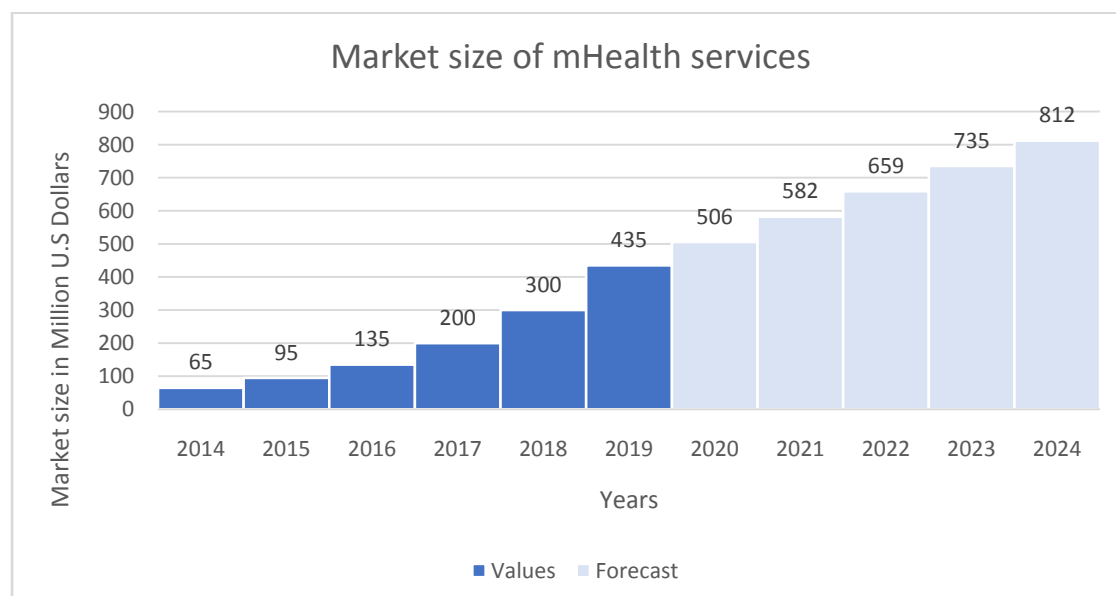
Data collected from field

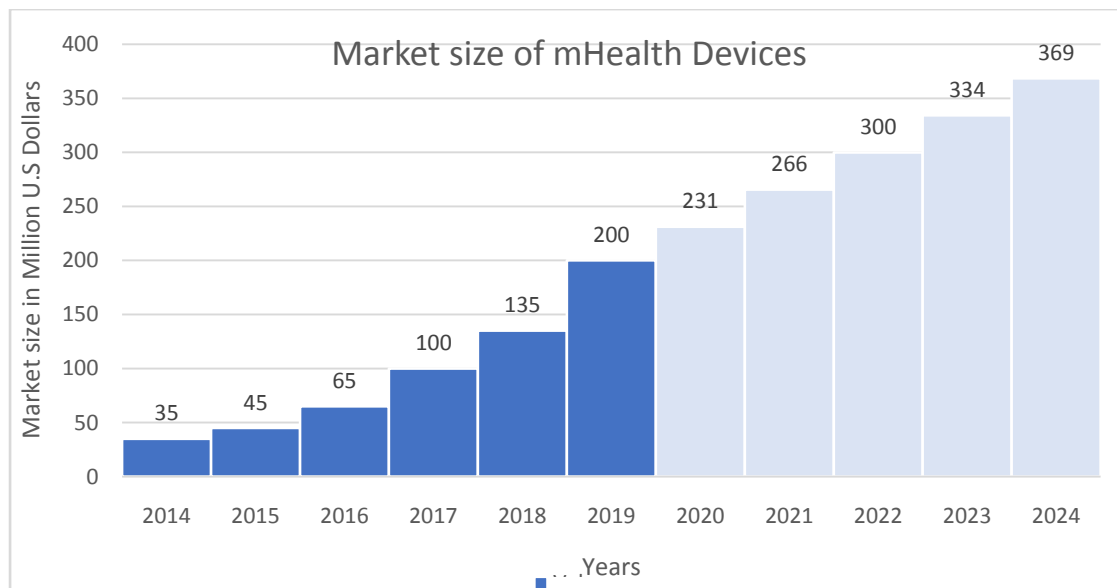
E). Percentage of patients who accepted mHealth.



INTERPRETATION: The above pie chart shows the result of survey in which 55% patients accepted and were ready to adopt this mHealth solution and they like the solution as they want a e prescription from the doctor sitting in a district hospital and 45% patients still doubted the capabilities and want to meet the doctor in person and want medication prescribed by the doctor in personal rather than e prescription.

F). mHealth Indian Market size by device and services.





INTERPRETATION: The above two graphs show the size of India's mHealth services and devices market from 2014 to 2024. These graphs show the forecasting for coming years. As the graph shows, the mHealth device and service was low in 2014 and increased in coming years and it's expected to be around 369 Million US dollars till 2024 for devices and for services it is expected to be 812 Million US Dollars till 2024.

(Indian mHealth market size by device and service 2014-2020, 2016)

DISCUSSION

The enormous differences amongst the rural and urban health services can be manifested from the ratio difference of availability of doctors in rural and urban health. Rural areas only have 33% share of doctors in India in spite of the fact that they have larger population share. The reason for this shortcoming is the reluctance of doctors to serve in rural areas. Recently, government Medical College students in Maharashtra protested against posting of doctors in rural areas.

In villages of India, where education and literacy rates are generally lower, mobile phones tend to be used mainly for communication and social media. This presents a challenge for the introduction of digital health which require more advanced digital skills. This is true in both developed and developing countries. Countries that have education programmes, can afford digital tools and have good access to the internet will have better digital skills. A lack of e-literacy and digital skills in rural areas means these populations will fall behind in the modern labour market. There is a need incorporating some courses for digital technology, for improved knowledge and skills among rural population. and for increased availability of digital technologies in rural so that it would be easy for people to accept the digital technology.

It was very difficult to convince old age people to believe mobile health technology, therefore, not many volunteered for it. Although, the youth and adults seem interested and amused by the wonders of digital technology and willingly volunteered to participate in the experiment.

Remote patient monitoring might be very helpful to people with chronic diseases but many people were not satisfied until they met the doctor on their own. Most people wanted to have a one on one conversation with the doctor and were not able to believe the staff. Old people were least contented with the mhealth solution. Many doctors were pleased with the portal as they could now save time see a larger no. of patients. But still there were doctors who wanted to see their patient in person and resisted using laptops or computers to connect with patients. So, finally 55% patients were accepting and willing to adopt Remote Patient Monitoring to get a prescription from a doctor. They don't usually get access to doctors in their locality and receiving a doctor's suggestion from your nearby PHC seemed a privilege to them.

CONCLUSION

The findings suggest that the government can promote this mhealth solution in rural areas as more than 50% people are satisfied with it. Implementation of RPM technology in rural areas will lead to a lot of development in the health conditions of people living in rural area and improve the situation of PHC's. Digitalization creates demand for digital skills and for people who are competent in using digital devices, understanding outputs and developing programmes and applications. This requires not only basic literacy and numeracy but also data handling. In rural areas where such skills are lacking, education must improve quickly.

Education and smartphone at certain extent have definitely made rural people more open minded and they were able to accept the working of Remote Patient Monitoring. Although, the presence of doctors is very important but technology can substitute doctors in Primary Health Centre's to a reasonable amount. Therefore, introduction of Mobile Health technology in rural areas is a profitable proposal. And with the introduction of Digital technology the quality of healthcare can reach the deprived corners of Rural area. The digital healthcare market in India was valued at INR 116.61 Bn in 2018, and is estimated to reach INR 485.43 Bn by 2024, expanding at a compound annual growth rate (CAGR) of ~27.41% during the 2019-2024 period. It means the digitalization in field of Health is increasing day by day.

The mHealth technology opens up about the most fundamental issue of doctor inaccessibility in the Rural areas as it not only connects the patients to a doctor remotely but also uses mHealth devices for diagnosis of the patient's health.

RECOMMENDATION

The mHealth technology alone is not a replacement for care by doctors; while some ailments can be fully treated remotely, telemedicine practices still need physical facilities where trained personnel can perform procedures, take diagnostic images, and draw fluids for tests. However, these virtual visits offer a cost-effective way to deliver medical care, particularly in rural areas with relatively few hospitals and little or no physical access to specialists.

The implementation of digital technology could save India \$4 billion to \$5 billion every year and replace half of in-person outpatient consultations in the country so it is essential to implement this technology.

Awareness need to be done about the mhealth technology in rural areas.

It is essential to implement the new digitized education tools in rural India. Introduction of such ed-tech tools can solve the problems of mass reach, quality and relevant education. And then trained personnel for digital technology easily available in rural areas. Teachers will be available via virtual classrooms, thereby plugging the problem of unwillingness in educationists to be physically present in many such areas.

LIMITATIONS

- mHealth depends heavily on an organization's ability to harness broadband technology. Wi-Fi networks are not reliable enough at a distance to support a fully functional mHealth deployment. Patient access to broadband technology is the biggest challenge mHealth faces
- lack of awareness: Maximum people in rural area don't know about the mhealth technology
- The access to mHealth apps is denied to a large section of the population because of their incapacity to afford it and the knowledge and skill to use it.
- These mHealth apps also make us dependent completely on the technology which might be a bane in the longer run. If one loses his or her mobile phones, often all the information is lost and can be misused too.
- Infrastructural inequities: A lot of villages deal with infrastructural lacunae related to electricity and potable water, apart from unavailable fundamental health and hygiene requirements.
- With an increasing number of companies trying to get a foothold in the mHealth market, it's also a challenge for practices and health systems to determine which mHealth apps are the most effective and will best meet the needs of their patients and providers.

ETHICAL CONSIDERATION

We have taken all measures possible to ensure that our study follows research governance and ethical protocol necessary for such research. The research will be conducted by taking the permission from Maharashtra government and the data recorded from Primary health center will remain confidential. The study benefits the participating nurses and doctor work by understanding whether the mHealth platforms improve the quality and experience of the health services in rural areas. The demo trial was performed in collaboration with primary health centre and a district hospital in Maharashtra with an aim to showcase how quality healthcare can reach the deprived corners of the Indian villages using digital health technology. The study patients were instructed on the assessment and the non-invasive Digital Health devices to be for the measuring the vital signs of the patients and the HEALTH CENTER nurse and the physician were trained on the Digital Health software as well as on the devices.

ANNEXURE

Name of the patient Age of the patient Gender

1. Do you know about mHealth technology?
A.YES B. NO
2. Have you ever been to this technology in your life?
A.YES B. NO
3. Are you willing to accept mHealth technology in your area?
A.YES B. NO
4. Is Doctor being easily available in your public Health centre?
A. Yes B. NO
5. Do You know How to use smart phone?
A. Yes B. NO
6. Are you willing to generate prescription from doctor online?
A. Yes B. NO
7. How frequently you go to district hospital for a regular check-up?
A. In a one-week B. In a two-weeks C. In three-weeks D. In four weeks

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