

Study on Acceptance of E-Health Connecting Facility

By

Puneet Sharma

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2016-2018



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TO WHOM SO EVER MAY CONCERN

This is to certify that **Dr Puneet Sharma** student of MBA Hospital Management from The IIHMR University, Jaipur has undergone internship training at **doctor.e Health Services Pvt Ltd**, Delhi from 5th February 2018 to 4th May 2018.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



Dr Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur



Dr Seema Mehta
Associate Professor
The IIHMR University, Jaipur



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Date: 5th MAY 2018

Dissertation Certificate

This is to certify that **Dr. Puneet Sharma** has completed his dissertation with Doctor E Health Services Pvt. Ltd from 5th February 2018 to 4th May 2018.

His topic of dissertation is “**A study on acceptance of e-health connecting facility: A gap analysis approach**”. Apart from that during this period, he familiarized himself with all the operations and processes of the laboratory, conducted initial market research and development and was also a part of the accreditation process of our laboratory.

On evaluation, he was found to be sincere, hardworking and efficient.
We wish him good luck for his future endeavors.

Best Regards,

Deeksha Gaur

Manager - HR

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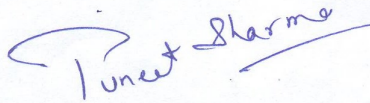
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CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled "A study on acceptance of e-health connecting facility".

A handwritten signature in blue ink, reading "Puneet Sharma". The signature is written in a cursive style with a long horizontal stroke at the end.

Signature of student

ABSTRACT

TITLE : A study on acceptance of e-health connecting facility

AUTHOR : Dr. Puneet Sharma

BACKGROUND: E-Health literacy is defined as “the ability to seek, find, understand and appraise health information from electronic sources and apply knowledge gained to addressing or solving a health problem. The main objective of this research is to identify, categorize, and analyze barriers perceived by physicians to the adoption of e-health connecting facility in order to provide implementers with beneficial intervention options.

OBJECTIVES: The study assesses the acceptance of e-health connecting facility amongst the stakeholders and analyze the barriers perceived by doctors and nurses to the adoption of e-health connecting facility.

METHODOLOGY: A cross sectional study was conducted in the hospitals in delhi and a sample of 100 (doctors and nurses) were taken under study through convenient sampling technique. A semi structured questionnaire was formulated and primary data was collected

Results: 71% of medical professionals have knowledge of web application availability for healthcare services like online ordering of the medicines, booking appointments etc. 74% of the medical professionals believe that e-health will add value to the organization, while only 18% disagree.

Conclusion: The main reasons/barriers why these professionals were reluctant to use the E-health even after admitting that it will enhance their work and make them available globally is:- Technology insensitivity: Most of the professionals are technologically insensitive. Non-reliability : e-Health is not reliable because all saved medical records could be lost because of backup issues and what if there is no internet access when needed to share some important data with patients online.

Key words: e-Health, EMR, Web application

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I will also like to extend my gratitude to Dr. Seema Mehta for guiding me through my dissertation period.

I embrace upon this as an opportunity for my following career and will attempt to use my skills and knowledge in the best possible way.

Sincerely,

Dr Puneet Sharma

Business development Manager

doctor.e, Health Services Pvt Ltd, Delhi

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2. LIST OF SYMBOLS AND ABBREVIATIONS

e-health – electronic health

m-health – mobile health

Gps – General practitioners

CT – Computed tomography

ECG – Electro cardio graph

VHC – Village Health Champion

DISSERTATION

1. INTRODUCTION

E-Health literacy is defined as “the ability to seek, find, understand and appraise health information from electronic sources and apply knowledge gained to addressing or solving a health problem

While advancements in technology have greatly simplified the procedures for routine pathological and radiological tests, people residing in geographically and politically difficult terrains don’t have access to good quality, evidence-based health care services.

E-health connecting facility seeks to bring high-end intellectual capital of pathologists and radiologists, and other medical professionals to people in these places virtually, through exclusively developed software systems, platforms and dedicated middleware to diagnostic equipments placed in such terrains. Diagnostic machines such as pathology analyzers, imaging equipment’s and microscopes, CT scanner etc will be networked and remotely connected and controlled over the cloud. Logical and analytical tools embedded in the software will divert the results of the investigation through a network operating centre to our panel of specialists who are virtually present on our software application irrespective of the geographical location.

Digital transmission of information through our proprietary gateways to a centralized facility would enable our panel of clinical experts to analyze and process test results and deliver the same to the patients in real time, ensuring timely and accurate medical intervention.

Current Scenario of E-health in India

The booming Indian healthcare sector is facing enormous challenges, particularly in the area of rural healthcare delivery. Inadequate infrastructure and qualified medical practitioners are considered the main reasons for the poor state of rural healthcare. Task-shifting, with paramedics taking a greater responsibility of care, is growing but this often needs to be supplemented with doctors’ opinions. Tele-health has evolved over the last decade as an interesting solution to provide distance support to healthcare workers at scale.

Technology solutions can also serve to support monitoring and data management which also are major challenges in today's healthcare systems. E-Health in general, and telemedicine in particular, is a vital resource to remote regions of emerging and developing countries but is often difficult to establish because of the lack of communications infrastructure. For example, in Bihar, hospitals often can become inaccessible due to flooding during the rainy season and across West Bengal, the low population density, along with severe weather conditions and the difficult financial situation in many tribal cities and villages, has meant that the majority of the West Bengal people are badly disadvantaged in medical care. In many regions there is not only a significant lack of facilities and trained health professionals, but also no access to e-Health because there is also no internet access in remote villages, or even a reliable electricity supply.

Internet connectivity, and the benefits of e-Health, can be brought to these regions using satellite broadband technology, and satellite is often the only solution where terrestrial access may be limited, or poor quality, and one that can provide a fast connection over a vast coverage area.

The range of services or systems that are at the edge of medicine/healthcare and information technology, including:

- **Electronic health record:** enabling the communication of patient data between different healthcare professionals (GPs, specialists *etc.*).
- **Computerized physician order entry:** a means of requesting diagnostic tests and treatments electronically and receiving the results.
- **e-Prescribing:** access to prescribing options, printing prescriptions to patients and sometimes electronic transmission of prescriptions from doctors to pharmacists.
- **Clinical decision support system:** providing information electronically about protocols and standards for healthcare professionals to use in diagnosing and treating patients.
- **Telemedicine:** physical and psychological diagnosis and treatments at a distance, including telemonitoring of patients functions.
- **Consumer health informatics:** use of electronic resources on medical topics by healthy individuals or patients.

- **mHealth or m-Health:** includes the use of mobile devices in collecting aggregate and patient-level health data, providing healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vitals, and direct provision of care (via mobile telemedicine).
- **Medical research using grids:** powerful computing and data management capabilities to handle large amounts of heterogeneous data.
- **Health informatics / healthcare information systems:** also often refer to software solutions for appointment scheduling, patient data management, work schedule management and other administrative tasks surrounding health.

There are three Innovative tele-health models currently operational in India.

Model 1: CARE Rural Health Mission

CARE has a hub-and-spoke model for tele-health delivery. It operates a central hub, based in Yavatmal district of Maharashtra that serves 40 villages (spokes) in nearby areas. It serves close to 1000-1200 patients per month across its various primary care centres. Each of the forty primary care centres (spoke) provides diagnostic services for basic ailments such as high blood pressure, diabetes, anaemia etc. In addition to clinical services, it also provides drugs, sanitary napkins and nutritional supplements to the rural patients. The spokes are manned by the ‘Village Health Champion’ (VHC), who is a married woman based in the village, and is trained by CARE in providing basic diagnostics. The primary care centres are serviced by a central hub located in the town of Yavatmal. The hub has an advanced diagnostic lab that houses equipment for blood tests, ECG, Ultrasound etc. The hub also has a well-stocked pharmacy used to supply drugs to the primary care centres. Doctors see patients at the hub at specified hours during the day.

CARE appoints one rural health worker for each village. The health worker, also called Village Health Champion (VHC) is a female who has considerable social equity in the village. She is responsible for undertaking day-to-day visits to patients in the village, primary care treatment and screening, insurance enrolments etc. For patients requiring treatment, she captures the symptoms on a standardized diagnosis form and informs the remote doctor of the same, who then prescribes the medicine that is

delivered to the patient by the VHC. All cluster coordinators report to the project manager who is responsible for coordination of activities across all villages. CARE is headquartered at Hyderabad, Andhra Pradesh.

In the current model, only basic technology is used to provide health access to the rural population. Technology does not seem to play a key role in the provision of services, other than providing a communication channel between the rural patients and medical practitioners. CARE is currently piloting handheld devices that would be given to a sample of VHCs. As of December 2011, 8 VHCs had been given these handheld devices for use under the pilot program. The handheld point-of-care devices have Java or Android-based applications built in to support various tasks (such as disease identification, recording information on past health, current 8 symptoms, insurance etc.) currently manually performed by the VHCs. The device would have a built-in decision-support system to assist the VHC in her decision-making. The device would be used to record medical and micro-insurance transactions. To enable easy adoption of devices, the applications are being built in local languages. Each handheld devices costs approx. INR 23,000 to procure. In the near future, CARE is planning to migrate to android smartphones/tablets in the scale up program of villages in the states of Andhra Pradesh and Odisha. 65% of the primary care problems are treated at the village level by the village health champion and 35% at hub clinic. Villages are now connected 24 X 7 and CARE Hospitals Doctor attend calls of health workers at any time of the day, if required.

Revenue model

The villagers are typically charged Rs. 10 per consultation by the VHC. At the town level (Hub), they are charged Rs. 20 per consultation. Average total cost of treatment (as reported by CARE) is Rs. 37 including consultation, drugs and basic lab investigations. CARE also operates a cost-plus drug pricing model at village level, depending on affordability levels of local community. Drugs are typically sold below MRP at village health centers, but sold at MRP at town-based hospitals. CARE also operates a micro-insurance model that has helped to increase the patient enrolment rates. CARE Foundation currently funds 25% of all costs incurred, while the rest

75% funding comes from external donors. It is planned to make the model self-sustainable in the next 2 years.

Drug delivery model

Procurement decisions related to costs, quantity and manufacturer are taken at the Hyderabad head office. The supply chain executive procures drugs from the manufacturer and distributes them to the village-level pharmacies, from where the drugs are distributed to VHCs and patients. The supply chain executive keeps track of drug stocks at each pharmacy. In case a drug stock gets over earlier than expected, the VHC or local pharmacist can also intimate the supply chain executive who then arranges for a stock replenishment. Recently, responsibility of drug procurement and supply has been transitioned to cluster coordinator as well.

Model 2: World Health Partners (WHP)

WHP uses SMS-based communication between SkyCare centers and SkyHealth centers, in order to simplify the overall process and to reduce dependency on technology. Mobile applications are typically not used by the village health workers. Numerical codes are assigned to each disease, drug, diagnostic test and referral hospital and information is exchanged via SMS between local health providers at the SkyCare Center and remote doctors. For instance, the local health worker connects to CMF through basic cell phone & doctors send a SMS based coded prescription which includes the diagnosis & treatment, such as ‘D3277’ & M 1234 to the SkyCare providers., where D refers to diagnosis and 3277 is the code for whooping cough, where M refers to medicine and 1234 is the code for a particular drug, such as paracetamol. There are similar codes for each pathology test (P) and Referral (R).The decoding is being done by the SkyCare providers with the help of decoding manual provided by WHP during training.

WHP’s technology infrastructure is more advanced compared to the other two models. WHP has a central medical facility from where the calls made by the Sky Network Center are routed to available doctors.

Revenue model

WHP operates a market-based model, where the local entrepreneur is free to decide the consultation fees based on market needs. Similarly, the Specialist is free to decide his/her consultation charges. WHP gets a margin from the local entrepreneur for every consultation. The CMF doctors are paid a monthly salary based on the number of patients seen.

Drug delivery model

The pharmaceutical supply chain is managed by WHP. Manufacturer brands the generic drugs as ‘Sky Meds’ and packages them. Each drug is assigned a numerical code by WHP. The WHP head office decides the procurement quantities. Drugs are supplied to each pharmacy who then distributes them to the patients. WHP has planned to buy approximately 800 generic drugs in its procurement list, 100 of which will be procured as Sky Meds which are frequently used.

Model 3: e-Health Point (eHP)

E-Health Point has a hub-and-spoke model for tele-health delivery. It operates a clinic or a primary care centre (central hub) in a town or large village that serves a number of smaller villages (spokes) in nearby areas. Each of the smaller villages has a water point provided by eHP that gives access to drinking water to villagers on a pre-paid basis. eHP serves patients in seven districts across the state of Punjab. The primary care centres provide diagnostic services for basic ailments such as high blood pressure, diabetes, anaemia etc. In addition to clinical services, eHP also provides drugs to rural patients.

Revenue model Fee is charged to users for all services, including: - Consultations - Diagnostic tests - Drugs eHP operates a cost-plus drug pricing model at village level, depending on affordability levels of local community. Cluster units (Water points + Clinic) typically become cash-flow positive in 1 year. Water-units turn profitable in less than 1 year, providing cross-subsidization to clinical units.

10 E's of E-health

- 1. Efficiency -one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement.**
- 2. Enhancing quality of care - increasing efficiency involves not only reducing costs, but at the same time improving quality. E-health may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.**
- 3. Evidence based - e-health interventions should be evidence-based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation. Much work still has to be done in this area.**
- 4. Empowerment of consumers and patients - by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, e-health opens new avenues for patient-centered medicine, and enables evidence-based patient choice.**
- 5. Encouragement of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner.**
- 6. Education of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers)**
- 7. Enabling information exchange and communication in a standardized way between health care establishments.**
- 8. Extending the scope of health care beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. e-health enables consumers to easily obtain health services online from global providers. These services can range from simple advice to more complex interventions or products such a pharmaceuticals.**

9. **Ethics** - e-health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.
10. **Equity** - to make health care more equitable is one of the promises of e-health, but at the same time there is a considerable threat that e-health may deepen the gap between the "haves" and "have-nots". People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively. As a result, these patient populations (which would actually benefit the most from health information) are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases.

SWOT ANALYSIS OF e-HEALTH MARKET IN INDIAN SCENARIO

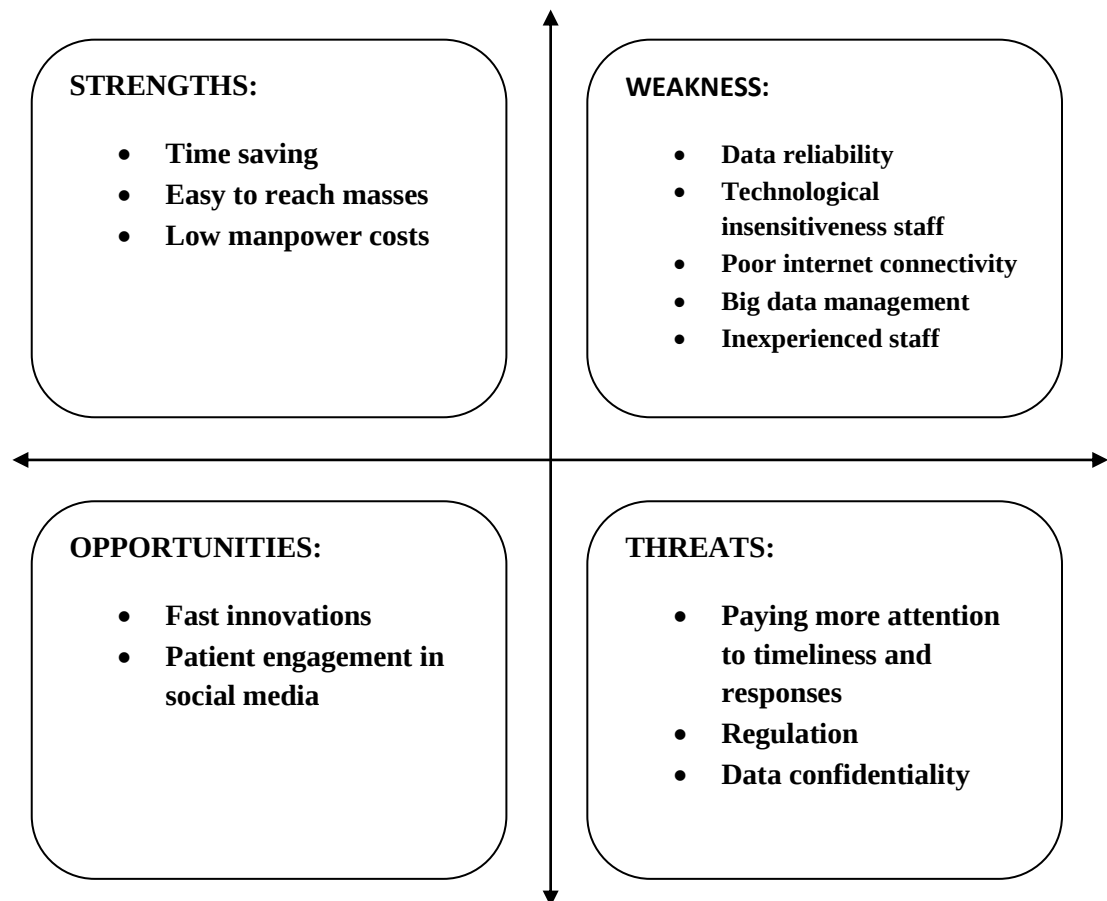


Fig. 3.1. e-HEALTH MARKET SWOT ANALYSIS

NEED OF STUDY:

India has less than one doctor for every 1000 population which is less than the World Health Organization standard. The population residing in rural areas are facing the major problem as doctors not available for consultation.

E-health will be a boon to rural India and can be a means to make Government of India's Universal Health Program a reality, where we can reduce the doctors to Patient gap and make "doctor-reach" a reality for the common and underserved population, thereby aiding in the process of making doctor accessible and available to the underserved population." Since E-health will improve communication, reduce medical error, help to store and access data, but still doctors and nurses are reluctant to use such connecting facility.

This study will help us in analyzing the acceptance level of doctors and nurses and the gaps that are present.

The objectives of the study are as follows:

OBJECTIVES:

1. To study the acceptance of e-health connecting facility amongst the stakeholders.
2. To analyze barriers perceived by doctors and nurses to the adoption of e-health connecting facility.

2. LITERATURE REVIEW

Despite the high expectations and interest in EMRs worldwide, their overall adoption rate is relatively low and they face several problems.

For instance, they are seen as contrary to a physician's and nurse traditional working style, they require a greater capability in dealing with computers and installing a system absorbs considerable financial resources.

This study extends work gleaned from technology acceptance studies in healthcare by investigating factors which influence perceived usefulness and perceived ease of use of e-health services.

Based on these empirical findings, we derive implications for the design and introduction of e-health services including suggestions for introducing the topic to physicians in ambulatory care and incentive structures for using e-health.

As healthcare professionals play an important role in the healthcare sector, there is no doubt that mechanism of newly introduced HIT and new application of the internet in medical practice should be coupled with healthcare professionals' acceptance. Therefore, with great resistance by healthcare professionals new mechanism and tools supported by IT and the internet cannot be used properly and subsequently may not improve the quality of medical care services.

3. METHODOLOGY:

STUDY DESIGN

The research conducted was descriptive (Cross-sectional)

SAMPLING METHOD

The sampling method was Non-Probability (Purposive) sampling

STUDY AREA

The study was carried out in South Delhi.

SAMPLE SIZE

Sample size for the study is 100:

Doctors: 60

Nurses : 40

Respondents

It includes

- **General physician, consultant physician, Orthopedician, Gynecologist, Pediatrician and endocrinologist and,**
- **Nurses.**

ETHICAL CONSIDERATION

Before collecting data ICF filled by respective respondents.

SAMPLING TECHNIQUE

Convenient Sampling

DATA COLLECTION

Primary data- The primary data for this project was gathered through survey using questionnaire, face to face interview online format also.

Secondary data- The secondary data for this project was gathered through different dependable articles.

RESEARCH INSTRUMENT (TOOLS AND TECHNIQUES)

Research instrument is the structured questionnaire consists of close ended questions for both doctors and nurses.

The information was collected by interviewing with doctors and nurses.

STUDY DURATION

3 months (5th February to 4th May)

DATA COLLECTION PROCEDURE

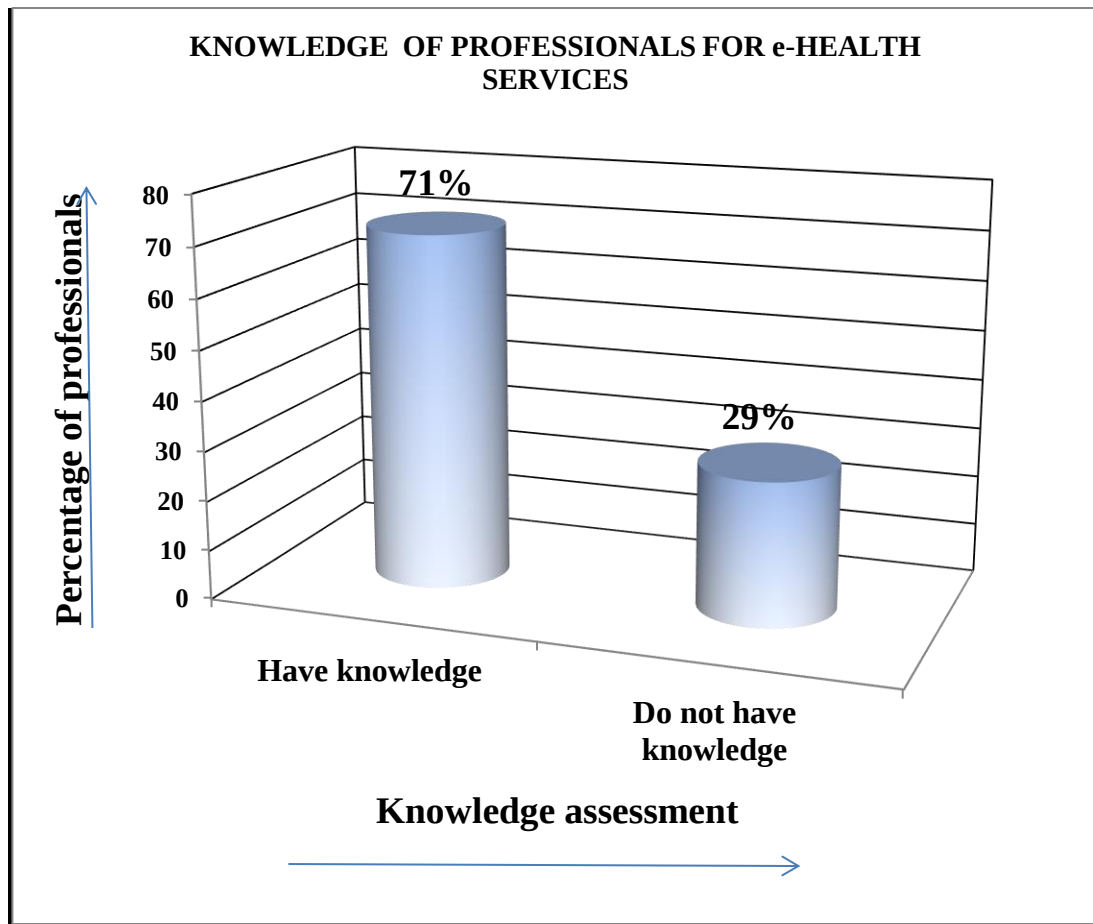
- **Data has been collected by using close ended questionnaire.**
- **Questionnaire consists of both qualitative and quantitative questions.**
- **Questionnaire was pre-tested by other respondents.**
- **After confirmation of pre-test questionnaire used in the field to collect data.**
- **Collected data was filtered and analyzed by using MS Excel.**
- **Data presented in the form of visuals by using table and graphs.**

4. RESULTS :

A. The acceptance of e-health connecting facility amongst the stakeholders:

i. Analysis of the knowledge about any e-health related application :-

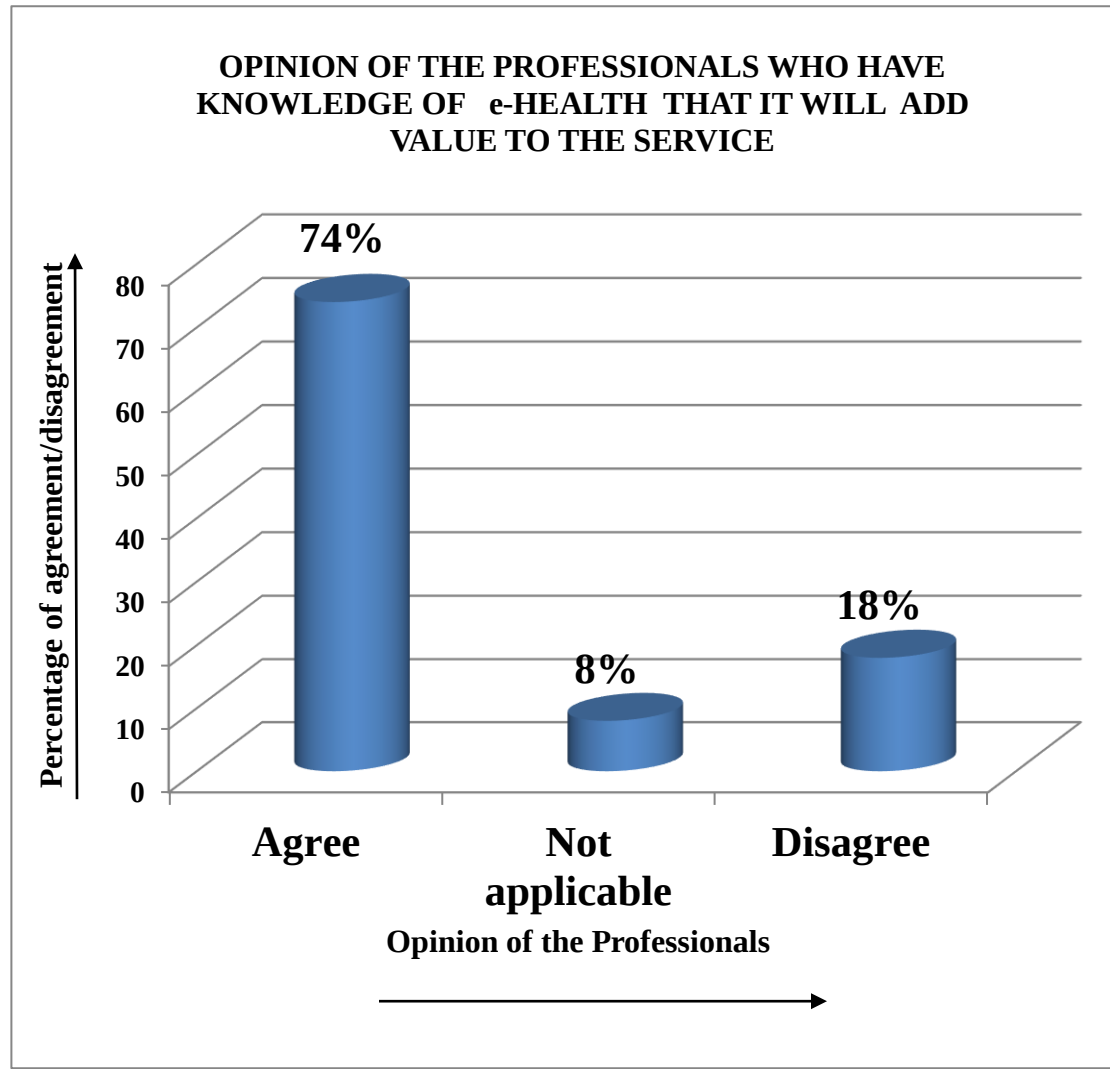
Graph.6.1. represents knowledge assessment of professionals for any health related applications



Graph.6.1. Knowledge assessment of professionals for any health related applications : 71% of medical professionals have knowledge of web application availability for healthcare services like online ordering of the medicines, booking appointments etc.

- ii. The percentage of medical professionals believing that the e-health will add value to their service:

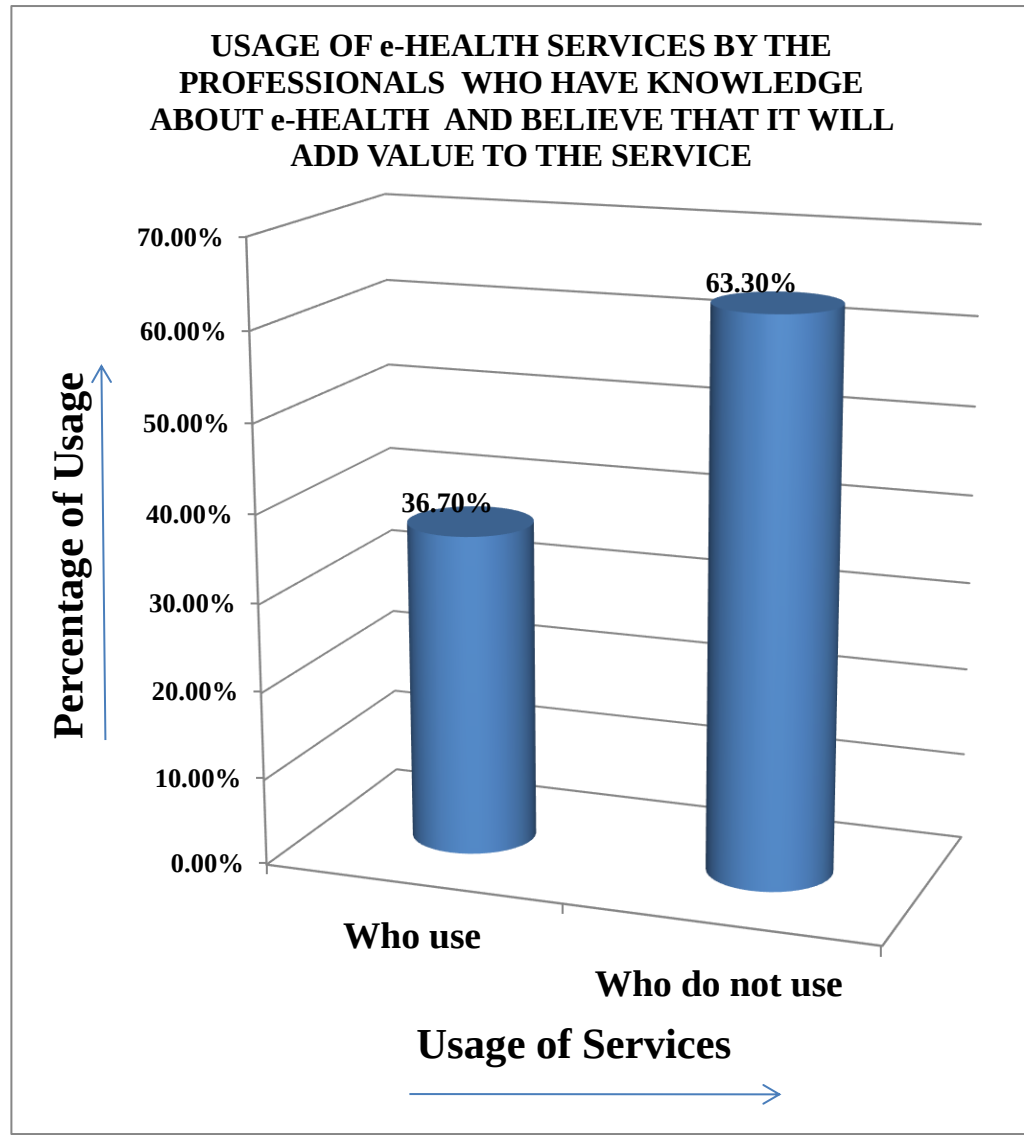
Graph.6.2. represents opinion of the professionals who have knowledge of e-health that it will add value to the service



Graph.6.2. Opinion of the professionals who have knowledge of e-health that it will add value to the service : 74% of the medical professionals believe that e-health will add value to the organization, while only 18% disagree.

iii. The percentage of professionals who use any of the e-health services:

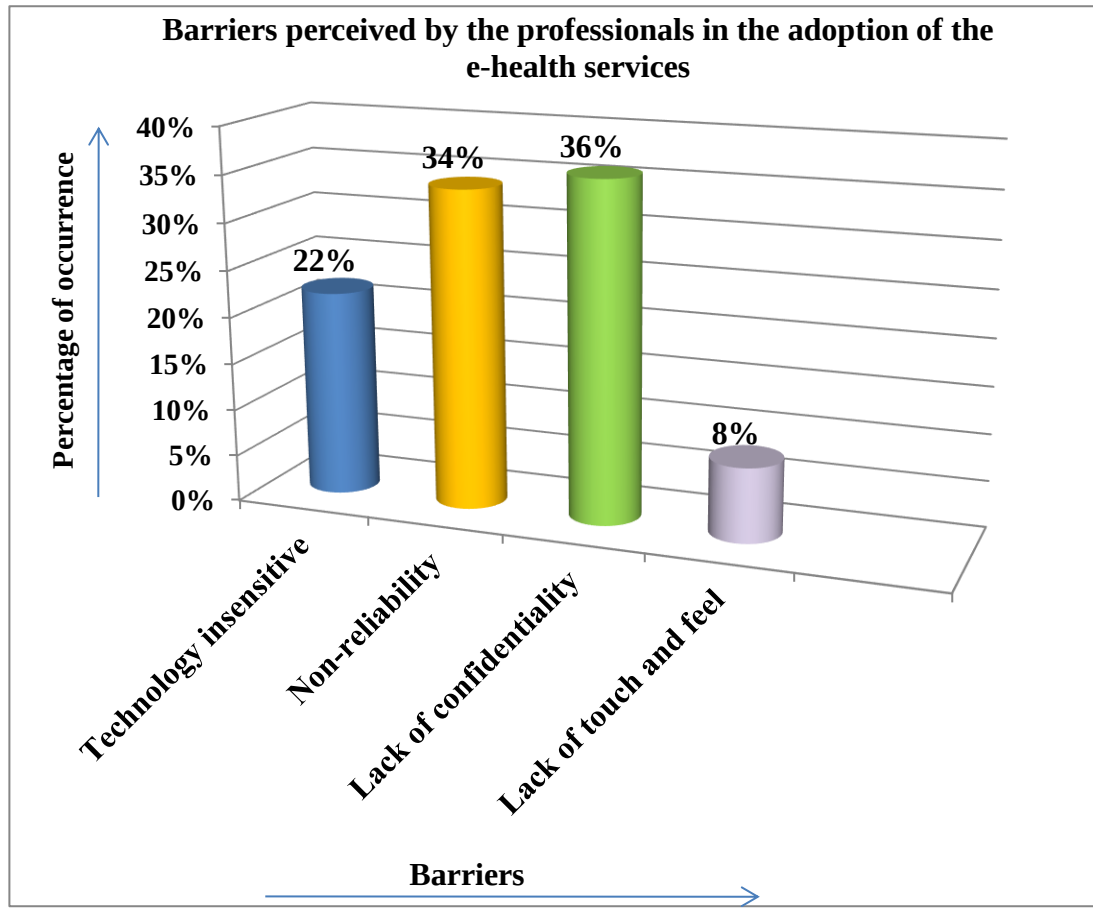
Graph.6.3. represents usage of e-health services by the professionals who have knowledge about e-health and believe that it will add value to the service



Graph.6.3. Usage of e-health services by the professionals who have knowledge about e-health and believe that it will add value to the service : *Only 36.7% of the professionals use any kind of e-health services for activities like uploading prescriptions, online consultations etc. This gap between having knowledge of the e-health services and still not using it, comes out to be a gap during the study.*

B. The barriers perceived by the professionals in the adoption of the e-health services :

Graph.6.4. represents Barriers perceived by the professionals in the adoption of the e-health services



Graph.6.4 Reasons for the gap (of not using e-health services):

- **Technology insensitivity:** Most of the professionals are technologically insensitive.
- **Non-reliability :** e-Health is not reliable because all saved medical records could be lost because of backup issues and what if there is no internet access when needed to share some important data with patients online.
- **Lack of confidentiality:** data is not confidential and may be used by anyone.
- **Lack of touch and feel.**

5. CONCLUSION:

a. The acceptance of e-health connecting facility amongst the stakeholders:

- **71% of medical professionals have knowledge of web application availability for healthcare services like online ordering of the medicines, booking appointments etc.**
- **Out of these 71%, 74% of the medical professionals believe that e-health will add value to the organization, while only 18% disagree.**
- **Only 36.7% of the professionals use any kind of e-health services for activities like uploading prescriptions, online consultations etc. This gap between having knowledge of the e-health services and still not using it, comes out to be a gap during the study.**

b. The main reasons/barriers why these professionals were reluctant to use the E-health even after admitting that it will enhance their work and make them available globally is:-

- **Technology insensitivity: Most of the professionals are technologically insensitive.**
- **Non-reliability : e-Health is not reliable because all saved medical records could be lost because of backup issues and what if there is no internet access when needed to share some important data with patients online.**
- **Lack of confidentiality: data is not confidential and may be used by anyone.**
- **Lack of touch and feel.**

6. RECOMMENDATIONS :

- **Trainings should be given to all the medical professionals to use the e-health web applications.**
- **And regular trainings should be held when there is upgradation in the software.**
- **The medical professionals should be taken into confidence and taught how to keep their data safe .**
- **Uninterrupted power supply should be maintained for battery backup so that reliable information is not lost.**
- **Some visits or meetings should be scheduled so that confidence and trust can be developed when there is interaction through internet.**
- **New technologies should be informed using telephonic calls, messages or mails.**

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3. APPENDIX:

SURVEY FORM

Hi. I am doing a survey to access laboratory services and the acceptance of E-Health connecting facility by the various stakeholders of healthcare especially doctors. This survey would take 3-5 minutes to complete. Your answers will be kept confidential and detailed in aggregate.

1. Out of the choices given below, rank each factor (on a scale of 1-6, 6 being least important and 1 being most important) on the basis of its importance for you while choosing a laboratory service?

☐ Consistency in the quality of lab work

☐ Timely reporting of critical values

☐ Test turnaround time

☐ Acceptability of the test results released

☐ Quality parameters being followed by the laboratory(IQC,EQAS)

☐ The Pathologist who runs the lab

2. How often do you have to ask your laboratory to repeat a test in a month ?

- One sample in a day
- 2-5 samples in a day
- 2-5 in a week
- 2-5 in a month

3. What makes you ask for a repeat sample?

- **Sample collection error**
- **Reporting error**
- **No standard result values**
- **Misidentification of patient**
- **Mismatch with other reports**
- **Mismatch with patient's medical history**

4. Do you know any e-health related web applications?

- **Yes**
- **No**

5. What is the acceptable variation in the result of a test?

- **+/-5**
- **+/-10**
- **+/-25**
- **+/-50**

6. (A)Is there any method of notifying critical values of a report ?

- **Yes**
- **No**

(B)If no, How would you like to get the notification?

- **Messages**
- **Email**
- **Phone call**
- **In person reporting**

7. Do you use any health related web applications?

- Yes
- No

8. (A) In your opinion, will E-Health connecting facilities (applications that provide online consultation, booking appointments, sharing patients laboratory result) benefit medical professionals:

- Agree
- Not applicable
- Disagree

(B) If no, why?

• I am not well versed with technology, therefore, e-Health is not useful for me	5	4		2	1
• e-Health is NOT reliable because what if I don't have internet access when I want to share some important data with my patient online	5	4	3	2	1
• e- Health is not reliable because my data is not confidential and may be used by anyone	5	4	3	2	1
• Physical interaction with a patient cannot be replaced by e-	5	4	3	2	1

interactions					
e-Health is not reliable because all saved medical records could be lost because of backup issues	5	4	3	2	1

9. A I read each, please Tell me whether you completely agree with it, somewhat agree, neither agree nor disagree, somewhat disagree or completely disagree with that statement.

Do you agree that e-health..

▪ Improves communication	5	4		2	1
▪ Reduces medical error	5	4		2	1
• Helps effective diagnosis	5	4		2	1
• Helps to access patient records and medical history easily	5	4		2	1
• Makes doctors more accessible worldwide	5	4		2	1