

**PRE- EMR IMPLEMENTATION STUDY ON PERCEPTION OF  
PHYSICIANS TOWARDS E-TRANSFER OF HEALTH INFORMATION  
OF ONE TERTIARY CARE HOSPITAL IN INDIA**

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**ABSTRACT**

*Health Care sector in India has witnessed significant growth during the last few years, both in quality and capacity. The relatively lower cost of health care, as compared to developed countries, coupled with international quality, has positioned India as a major destination for health care services. One of the most significant and promising trends in healthcare information technology is the emergence of health information exchange (HIE) with the potential clinical benefits of HIE and the challenges of implementation of EHR in all hospitals in India.*

*We carried out a study with the objective of accessing the perceptions of physicians' toward e – transfer of patient health information as a part of pre-EHR implementation project in one tertiary care hospital in India.*

*It is a cross sectional study. Physicians were requested to indicate their level of perception towards e-transfer in the areas of documentation of patient care, referrals, telemedicine, time, security, communication and research. Data collection tool was Questionnaire. Analyzing the result of 182 samples was done by using SPSS V 16.0. Result is interpreted with percentiles and significance ( $\chi^2$ ).*

*As physicians play a major role in the healthcare delivery, the willingness to adapt to upcoming e-environment is much expected from them. We analyzed perception of the physicians towards the e-transfer of patient information in the areas of documentation of patient care, referrals, telemedicine, time, security, communication and research. The result showed significant differences in physicians' perception. This means that there was a deviation in the way they perceived the concept of e-transfer and most were reluctant to adapt to technology. From administrator's standpoint, there should be a proper understanding why physicians resist information technology and how such resistance is manifested in their subsequent behavior, can help them devise appropriate intervention strategies for minimizing resistance and its effects on the organization. A better understanding of user perception and understanding may help to develop strategies for user acceptance to e-healthcare environment.*

## **KEY WORDS**

ELECTRONIC MEDICAL RECORD, E- TRANSFER, HEALTH INFORMATION, PERCEPTION, PHYSICIANS

## **INTRODUCTION**

When patients visit healthcare facilities, a record of all the information regarding their visit such as tests carried out, procedures performed, medicines prescribed, etc. is maintained by the facilities. This provides a holistic view of the patient's visit and condition and in the simplest sense can be termed as patient information.

The management of patient health information in healthcare facilities started out in the form of paper based medical records. This method had its fair share of advantages such as, they are not destroyed if a hard drive crashes, they can be accessed without power, the original copies can be maintained and they are relatively inexpensive when compared to computerized medical records. A few disadvantages that many came across would be that these paper-based records took up a large storage space; they were also hard to track and were often easily misplaced.

Up until the mid-1960's almost all healthcare facilities still resorted to paper based patient medical records. It was after this point that healthcare facilities decided to use computerized models instead of the paper-based systems. The El Camino Hospital in Mountain View, California was the first to introduce a computerized clinical management system [1]. After which computerized health systems started to bloom slowly but surely in healthcare facilities across the globe. Computerized health records are efficient and save time and provide a better interface to work with. They are safe and secure and reduce human errors and it accomplishes this while providing a pool of data that helps when needed. The major drawback of such a system is the perceived threat to privacy and confidentiality and to some extent the lack of standardization. The computerization of patient health records not only involves the documentation but, also many other functions that need to be carried out for a healthcare facility to run smoothly. These include health information and data that is used to make informed decisions regarding the patient, result management with respect to labs and reports, decision support that helps make the right decisions, communication systems and lastly and perhaps one of the most important is the exchange of information.

In computerized systems this exchange of health information done via the Internet. The Internet provides unprecedented opportunities for interaction and data sharing among health care providers, patients, and researchers. However, the advantages provided by the Internet come with a significantly greater element of risk to the confidentiality and integrity of information [2]. The exchange of this information could take place for various reasons such as, to seek a second opinion on a particular medical condition or maybe if the patient needs to be referred to another healthcare facility or even to obtain an expert's opinion on the matter. This is generally known as e-Transfer of patient information. Technology is a critical tool in achieving the benefits of health information exchange (HIE). However, technology alone is

not sufficient. As the health sector is getting ready for massive growth in the coming years, all or most of healthcare sector in the country will require extensive use of information and communication technology (ICT) infrastructure, healthcare services and databases for policy planning and implementation [3].

e-transfer of health information allows doctors, nurses, pharmacists, other health care providers and patients to appropriately access and securely share a patient's vital medical information electronically, improving the speed, quality, safety and cost of patient care[4]. Despite the widespread availability of secure electronic data transfer, most Indian's medical information is stored on paper in filing cabinets of most healthcare providers, or in boxes and folders in small clinics. When that medical information is shared between providers, it happens by mail, fax or most likely by patients themselves, who frequently carry their records from appointment to appointment. While electronic health information exchange cannot replace provider-patient communication, it can greatly improve the completeness of patient's records, as past history, current medications and other information is jointly reviewed during visits. Appropriate, timely sharing of vital patient information can better inform decision making at the point of care and allow providers to avoid readmissions, medication errors, improve diagnoses and decrease duplicate diagnostic testing. Many benefits exist with information exchange regardless of the means of which is it transferred. There are studies demonstrating the potential benefits of EHR (Electronic Health Record) and other HIT in reducing adverse drug events [5], improving healthcare delivery [6], and lowering costs [7]. Less common, however, are investigations of the behavioral problems associated with HIT usage, such as physician resistance. Instances of physician resistance to HIT systems are documented in the practitioner press, but little known as to how and why it happens.

Health Care sector in India has witnessed significant growth during the last few years, both in quality and capacity [3]. Cost of healthcare is less when compared to some of developed countries where healthcare financing is mixed type of tax-based, health insurance and out of pocket. For this reason India is one of the major destination for healthcare services with quality healthcare services provided in both public and private sectors are ready to invest in infrastructure. This is expected to position health care as one of the largest service sectors and a significant contributor to country's GDP [3]. Government of India had initiated number of

steps related to standardization of health information exchange including telemedicine from time to time. In 2003, Ministry of Communication and Information Technology (MCIT) had prepared and published a recommended framework for IT infrastructure for healthcare including recommendations on guidelines, standards and practices for telemedicine in India. The taskforce set up by Ministry of Health and Family Welfare (MoHFW) in 2005 for telemedicine also looked at the issues and standards related to EMR [3]. Miles stone in this area is the emergence of health information exchange (HIE). With this, understanding the vast benefits in delivery healthcare services, the healthcare sector is facing the challenges of implementation of EMR in their setting.

### **OBJECTIVE**

We carried out a study with the objective of accessing the perceptions of physicians' toward e – transfer of patient health information as a part of pre-EHR implementation project in current study setting.

### **STUDY SETTING**

Kasturba Hospital is a Tertiary hospital serving people in and around the district of Udupi, India. It got started in May 1961, with 150 beds. Today, Kasturba Hospital has over 2032 beds. The daily average number of New OP Registrations per day is 468; Repeat Registrations per day 1582; daily Inpatient admissions are 249. The Kasturba Hospital is fully equipped with state-of-art diagnostic and therapeutic departments to facilitate treatment of a wide range of medical and surgical diseases. It is well equipped for advanced and sophisticated surgeries such as coronary bypass and open-heart surgery as well as kidney transplantation. The cancer research hospital is situated adjacent to the main hospital. It is accredited to National Accrediting Board for Hospitals and Healthcare Providers (NABH) ([www.manipal.edu](http://www.manipal.edu))

### **METHOD**

This is a cross sectional study. After organizational ethical clearance, we conducted a study on physicians of selected hospital regarding their perception of transferring health information electronically (e-transfer). Physicians were also asked to indicate their level of

perception towards e-transfer in the areas of documentation of patient care, referrals, telemedicine, time, security, communication and research. Those who were willing recruited into the study. Final sample size was 182. Questionnaire that was validated consisted of 20 questions related to above mentioned areas. This questionnaire used the “Likert five point scale” to determine the levels of perception of the physicians with strongly disagree (1point), disagree (2 points), no opinion (3 points), agree (4 points) and strongly agree (five points). Data collection was done by distributing the questionnaire by personally going to each physicians and explaining the purpose of the study. Analyzing the information received was done by using SPSS V 16.0 percentiles and significance ( $\chi^2$ ).

## RESULT

Age and gender were included in questionnaire but the identification was not disclosed. Age was categorized into four groups. viz. 25-30, 31-40, 41-50, 51-60 years of age. The result showed, maximum physicians fall under the age group of 31-40 years (n=56) and minimum under 25-30 years (n=37). Out of 182 physicians 109 were male doctors and 73 were female doctors.

**TABLE 1: PERCEPTION OF PHYSICIANS TOWARDS E-TRANSFER OF HEALTH INFORMATION**

Q. No.	Questions	Strongly Disagree N (%)	Disagree N (%)	No Opinion N (%)	Agree N (%)	Strongly Agree N (%)
1.	For optimum patient care, the collection and maintenance of transfer of patient information is vital.	7 (3.8%)	12 (6.6 %)	16 (8.8 %)	63 (34.6 %)	84 (46.2 %)
2.	Exchange of information via the internet is a better option	3 (1.6 %)	20 (11 %)	42 (23.1%)	97 (53.3 %)	20 (11 %)
3.	E-Transfer of patient information facilitates instant and continual care	6 (3.3 %)	24 (13.2%)	69 (37.9 %)	59 (32.4 %)	24 (13.2 %)

	of the patient.					
4.	E-Transfer is best done, when done completely. (Text, Audio, Video, Images, etc)	8 (4.4 %)	39 (21.4 %)	44 (24.2 %)	61 (33.5 %)	30 (16.5 %)
5.	A healthcare facility can function without any computerization.	18 (9.9 %)	32 (17.6 %)	60 (33 %)	45 (24.7 %)	27 (14.8 %)
6.	E-Transfer saves time	4 (2.2 %)	10 (22 %)	49 (26.9 %)	59 (32.4 %)	30 (16.5 %)
7.	E-Transfer provides better security.	11 (6 %)	37 (20.3 %)	59 (32.4 %)	48 (26.4 %)	27 (14.3 %)
8.	E-Transfer can be remotely done.	4 (2.2 %)	48 (26.4 %)	40 (22 %)	57 (31.3 %)	33 (18.1 %)
9.	E-Transfer ensures a smoother flow of patient data.	14 (7.7 %)	23 (12.6 %)	54 (29.7 %)	58 (31.9 %)	33 (18.1 %)
10.	E-Transfer simplifies the processes of referrals and consultations	8 (4.4 %)	39 (21.4 %)	54 (29.7 %)	55 (30.2 %)	26 (14.3 %)
11.	E-Transfer of patient data enhances multi-disciplinary communication and research.	14 (7.7 %)	34 (18.7 %)	45 (24.7 %)	61 (33.5 %)	28 (14.8 %)
12.	E-Transfer of patient data completely supports the clinician in the practice of telemedicine.	15 (8.2 %)	27 (14.8 %)	55 (30.2 %)	52 (28.6 %)	33 (18.1 %)

13	Patient information can be exchanged by ways other than e-Transfer.	21 (11.5 %)	40 (22 %)	53 (29.1 %)	42 (23.1 %)	26 (14.3 %)
14	E-Transfer of patient information is a much better option than the manual or paper route.	13 (7.1 %)	40 (22 %)	44 (24.2 %)	54 (29.7 %)	31 (17 %)
15	Exchange of health information via the Internet poses a threat to the confidentiality of the patient and hence may violate the patient-professional confidentiality.	14 (7.7 %)	30 (16.5 %)	47 (25.8 %)	51 (28 %)	40 (22 %)

Result in table 1 shows physicians' perception toward e-transfer of health information. Physicians generally appeared to have mixed perception both positive and negative toward e-transfer. More than 80% physicians agree/strongly agreed, for optimum patient care; the collection and maintenance of transfer of patient information is vital; 20% of the physicians disagree/strongly disagreed; nearly 30% of the physicians did not give their opinion. 64% physicians opined that exchange of information via internet is a better option. Less than 46% physicians agreed to e-transfer of patient information facilitates instant and continual care of the patient; 50% agreed e-transfer is best done, when done completely; less than 40% physicians opined that a healthcare facility can function without any computerization and less than 50% opined it saves time. 41% agreed e-transfer provides better security and 49% agreed it can be remotely done; 50% agreed it ensures smoother flow of patient data while 30% physicians did not respond. Less than 45% physicians agreed e-transfer simplifies the processes of referrals and consultations and 47% agreed e-transfer of patient data enhances multi-disciplinary communication and research. Less than 47% opined e-transfer of patient data completely supports the clinician in the practice of telemedicine & also perceived patient

information can be exchanged by ways other than e-transfer. Less than 47% perceived that e-transfer of patient information is much better option than manual record and 50% opined exchange of health information via internet poses a threat to the confidentiality of the patient and hence may violate the patient – professional confidentiality.

TABLE 2: PERCEPTION OF PHYSICIANS: RESULT OF SIGNIFICANCE TEST (X<sup>2</sup> TEST)

Q. No.	Questions	Mean	SD	Sig. 'p'
1.	For optimum patient care, the collection and maintenance of transfer of patient information is vital.	4.22	1.042	<.001*
2.	Exchange of information via the internet is a better option	3.72	.865	<.001*
3.	E-Transfer of patient information facilitates instant and continual care of the patient.	3.49	.950	<.001*
4.	E-Transfer is best done, when done completely. (Text, Audio, Video, Images, etc)	3.44	1.114	<.001*
5.	A healthcare facility can function without any computerization.	3.16	1.219	.003*
6.	E-Transfer saves time	3.45	1.050	<.001*
7.	E-Transfer provides better security.	3.23	1.165	<.001*
8.	E-Transfer can be remotely done.	3.39	1.110	<.001*
9.	E-Transfer ensures a smoother flow of patient data.	3.45	1.135	<.001*
10.	E-Transfer simplifies the processes of referrals and consultations	3.25	1.121	<.001*

11.	E-Transfer of patient data enhances multi-disciplinary communication and research.	3.35	1.218	<.001*
12.	E-Transfer of patient data completely supports the clinician in the practice of telemedicine.	3.23	1.211	.002*
13.	Patient information can be exchanged by ways other than e-Transfer.	2.95	1.247	.027*
14.	E-Transfer of patient information is a much better option than the manual or paper route.	3.20	1.184	.001*
15.	Exchange of health information via the Internet poses a threat to the confidentiality of the patient and hence may violate the patient-professional confidentiality.	3.20	1.184	.001*

*\* p' value is highly significant*

The results in table 2 show that all the responses differ significantly. All the x2 test values are found to be statistically significant

## **DISCUSSION AND CONCLUSION**

One of the most significant and promising trends in healthcare information technology is the emergence of Electronic Health Records. For years, governmental agencies, healthcare insurers, and healthcare advocacy groups have advocated healthcare information technologies (HIT) as the means to reducing medical error rates, improving healthcare delivery quality, and lowering healthcare costs [8]. India is not far from reaching its goal provided all users of health information should be aware of this and willing to contribute to the progress. As physicians play a major role in the health of population, the willingness to adapt to e-environment is much expected from them. In this regard the current aim of this study analyzed perception of the physicians towards the e-Transfer of patient information, and the results showed significance difference in physicians' perception. This means that there was a deviation in the way they perceived the concept of e-Transfer. This provides a scope to create awareness in this matter even though more than 80% physicians working in this setting agreed that e-transfer of patient information is vital for optimum patient care. Most of the physicians (64%) were aware of the fact that information via internet is a better option. And the most significant finding was that more than 50% physicians did not respond or disagreed

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to the benefits of e – transfer of patient information in continual of care, time, security, smoother flow of information, simplification of referrals and consultations, multidisciplinary communication & research. This perception about e-transfer of health information, given the expected benefits of such systems, not only depicts physicians’ current understanding of information technology (IT) its adoption, usage and its contribution to research, but may also seriously undermine the potential benefits of information systems [8].

As physicians play a major role in the healthcare delivery, the willingness to adapt to upcoming e-environment is much expected from them. We analyzed perception of the physicians towards the e-transfer of patient information in the areas of documentation of patient care, referrals, telemedicine, time, security, communication and research. The result showed significant differences in physicians’ perception. This means that there was a deviation in the way they perceived the concept of e-transfer and most were reluctant to adapt to technology. Many observation study on implementation of EMR in bigger hospitals in India, shows that the old system of training employees with software demonstration has little impact on their perception and acceptability. More of strategic training with focus on features and functions of EMR, its impact on service production needs to be addressed. Furthermore, from administrator’s point of view, there should be a proper understanding as to why physicians resist information technology and how such resistance is manifested in their subsequent behavior can help them devise appropriate intervention strategies for minimizing resistance and its effects on the organization. A better understanding of user perception and understanding may help to develop strategies for user acceptance to e-healthcare environment.

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