Assessment of hospital IT landscape in Delhi NCR

A Dissertation Proposal for

A dissertation submitted in partial fulfillment of the requirements

For the award of

Post Graduate Diploma in Health and Hospital Management

By

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Kasper EXPERTISE FROM EXPERIENCE
CONSULTING

Certificate of Internship Completion

Date: 10th April 2012

To Whomsoever IT May Concern

This is to certify that Mr. Akshay Soni has successfully completed his 3 months internship in our organization from 10th January, 2012 to 9th April, 2012. During this period the intern has worked on the project Assessment of hospital IT landscape in Delhi & NCR using Business Intelligence tool under the guidance of me and my team at Kasper Consulting and provided good results.

We wish him good luck for his future assignments

Sincerely,

Inder Kumar

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Certificate from Dissertation Advisory Committee

This is to certify that **Akshay Soni,** a participant of the **Post- Graduate Diploma in Health and Hospital Management,** has worked under our guidance and supervision. He is submitting this dissertation titled **"Assessment of hospital IT landscape in Delhi NCR."** in partial fulfilment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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Certificate of Approval

The following dissertation titled " **Assessment of Hospital IT Landscape in Delhi NCR"** is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

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Lastly, but not the least I would like to thank my family, friends and colleagues for their support and understanding.

Akshay Soni

Table of Content

Acronyms / Abbreviations / Keywords

ADE	ADVERSE DRUG EVENTS.
BCMA	BAR CODED MEDICATION ADMINISTRATION.
BID	TWICE A DAY.
CPOE	COMPUTERISED PATIENT ORDER ENTRY.
CPRS	COMPUTERISED PATIENT RECORD SYSTEM.
HER	ELECTRONIC HEALTH RECORD.
E-SIGN	ELECTRONIC SIGNATURE.
GDA	GENERAL DUTY ATTENDANT.
GUI	GRAPHIC USER INTERFACE.
HIS	HOSPITAL INFORMATION SYSTEM.
IP	INPATIENT.
IT	INFORMATION TECHNOLOGY
OP	OUTPATIENT.
RPH	REGISTERED PHARMACIST.
TID	THRICE A DAY.
UD	UNIT DOSE.
VA	VETERANS AFFAIRS.
VisTA	VETERANS HEALTH INFORMATION SYSTEM & TECHNOLOGY ARCHITECTURE.

1. Kasper Consulting Profile

Kasper Consulting, setup in 2008, is an Information Technology and Business consulting firm founded by a group of CIOs, CTOs and experienced management professionals. Kasper has the domain knowledge in the Financial Services, Healthcare and HR Consulting industries and advises its clients on IT strategy, business efficiencies and transformation. We do not sell hardware – we do not sell software – we do not do application software development – we do not provide telecom and data center infrastructure!

While we do not sell hardware or software, our experienced professionals can help evaluate and recommend the hardware/software for you based upon your business needs and even help you with the commercial negotiations with the vendors.

While we do not do application software development, we can evaluate and recommend third party resources best for your needs – and even help you negotiate turnkey or T&M contracts. Moreover, we will manage your projects for successful implementation using these resources.

While we do not provide telecom and data center infrastructure, we will evaluate your infrastructure and give a recommendation based upon your business model and your existing assets. We will help define the service level agreements (SLAs) with your vendors for effective operations.

We are product/vendor neutral so we truly work for you and have your best interests in mind working for your success. We will understand your business needs – we will leverage your existing assets - and accordingly our recommendations will be based on “best of need” instead of “best of breed”. We will be accountable for your success – and therefore will not just make our recommendations but will also work with you for a successful implementation.

2. Abstract

"Assessment of hospital IT landscape in Delhi NCR"

Introduction:

Health information technology (HIT) is "the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making" Hospital across Delhi have started to use IT systems in a big way and utilizing the benefits of IT in hospital for quality care. Through this study we will analyze the current usage of IT systems in hospitals and understand their need for the using IT systems and also understand the barriers and challenges faced during IT implementation and day to day challenges, such as proficiency of staff using IT and adoption by end users.

Goals:

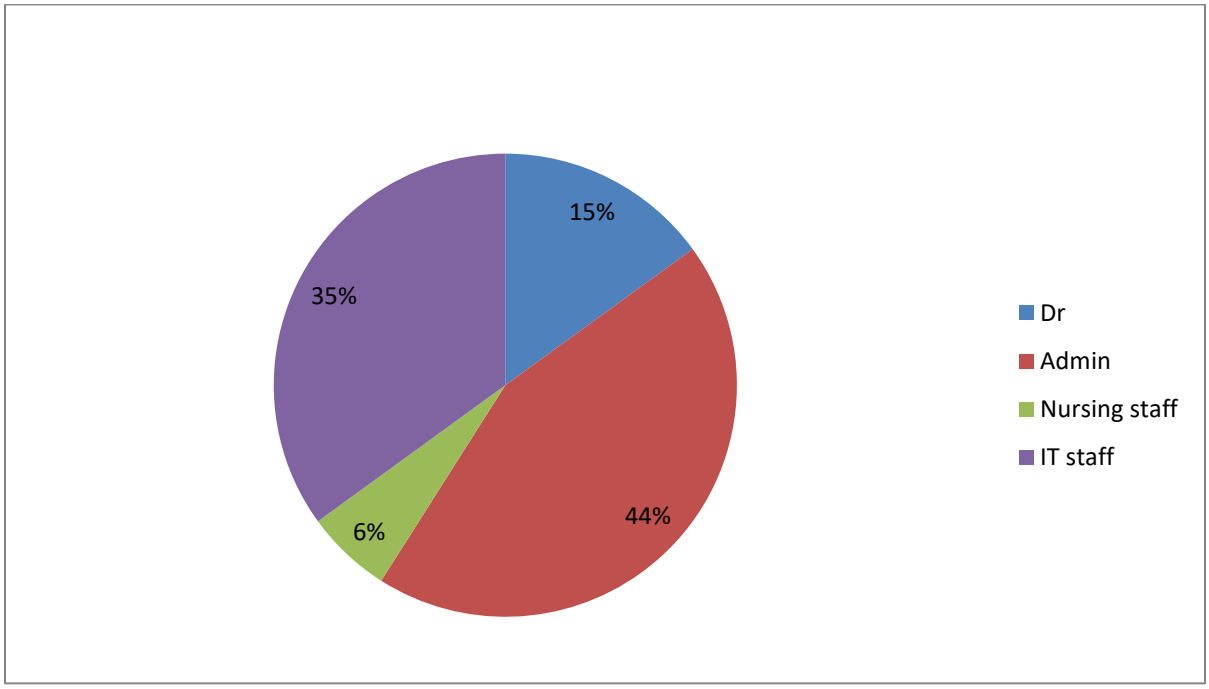
- To understand the usage of IT in hospital.
- Grading of hospital based on modified EMR adoption model of HIMSS (India's context).
- Across sectional analysis of No. of beds Vs Stage of modified HIMSS (India's context).

Sample Size:

- 31 Hospital across Delhi and NCR region.
- Total the Research team met 34 people.
- It included total 5 Dr, 15 administrators, 2 nurses, 12 IT staff people.
- Convenient sampling: As the Choosing of sample of hospitals in Delhi NCR was as per the convenience of the Researchers at kasper.

Respondents Profile

- Bulk of the respondents were administrators 42%, then came IT staff 36%.
- The Respondents were doctors, CEO, administrators, IT department heads and nursing staff.



Methodology:

- Quantitative research using close end Questionnaire Survey.

Analysis

- By Ms Excel.

Desired Outcome:

- To understand the current usage of IT systems in hospital.
- Barriers for IT adoptions in hospitals.
- Day to day challenges in using IT systems in hospitals.
- Penetration of Health IT in hospitals.

3. Introduction

Technology is one of the most pervasive and ubiquitous tools in the healthcare today. Information technology solutions have already started to become an integral part of the healthcare system to raise its productivity and enable innovations. it is now widely accepted as part of daily work practices in most of the organizations.

There is compelling evidence to demonstrate that the adoption of health informatics results in improved patient safety and the delivery of a higher level of patient care. Health care informatics uses technology, such as computers and networking, and multidisciplinary health sciences, such as biomedical and pharmacy, to improve patient care. Informatics organizes patient data into a coherent format suitable for smooth health care processes.

Incorporation of IT in healthcare industry can result in improved teamwork; diagnosis related information is delivered at a faster rate; potential drug interactions and allergies are identified earlier; and health records are maintained more consistently and securely. By demonstrating the substantial savings that can be achieved through using it in the healthcare industry, we believe that we can accelerate the deployment of new technologies to help healthcare providers tackle the challenge of stretching budgets further.

Origins

In 1949, Gustav Wager founded the first professional organization for informatics in Germany. Informatics training programs began during the 1960s in France, spreading throughout Europe and to the United States by 1970. This early form of health care informatics focused on generating bills and patient admissions/discharges. US hospitals that implemented this structure include latter-day saints hospital in Salt Lake City, Utah; Massachusetts general hospital in Boston; and Kaiser Permanente in Oakland, California.

Technological Advances

The rapid rise and spread of health care informatics is linked to technology and computers advances during the 1970s. The systems of this time used a single mainframe and time-shared computers to process all patient information. By the 1980s, health care practitioners used several small computers on the same patient database. Organizations began to develop standards and protocols for health care information transmissions. This form of informatics was unable to produce customized reports and still focused on financial aspects.

HIS (Hospital information system) of various vendors are there in Delhi NCR

a. Shristhi
b. Akhil systems
c. Cprs Vista
d. Wipro
e. Acuis
f. Medtrack

Types of EMR (Electronic Medical Record)

Web-based system

The Web based system is a remotely hosted electronic medical system accessed via an internet web browser. Such systems are accessed by paying a rental or monthly access fee. The server on which the application is hosted is secure and is located outside the Practice. All technical aspects of the server like, maintenance, backups etc. are maintained by a professional IT company. Another major advantage is that most of the computing is done on the remote server and because of this, the requirements of "onsite hardware" is greatly reduced. This kind of a setup allows the physician to access all information at any time from anyplace with Internet access.

Another major disadvantage is that by virtue of the fact that the EMR is a point and click intensive application , a lot of vital time is lost waiting for the data to transfer over the internet, all these vital seconds can add up to a lot of time thereby reducing the total number

of patients that could have been seen. Another disadvantage is that the confidential information of the patients and other details will have to be left at the mercy of the vendor. Keeping periodic backups of data is a very important aspect of using these systems.

The client / Server model

This allows for a much faster response time as data from the server to the client is transferred much faster usually at 100 Mbits/second. Client / Server systems also allow a practice to have complete control over its data. This allows the practice to directly make arrangements of backup without having to get in touch with a vendor. The disadvantages are that initial costs are high as "onsite hardware" requirements are more. The initial cost of the application is also high. Maintenance of the server has to be carried out by the practice and this adds to the resource requirements. To sum up if the practice has multiple locations then it makes sense to go for a web based Electronic medical records system. On the other hand, if the practice doesn't have multiple locations and the performance requirements are rather high, then it is advisable to opt for a client / server system

EMR (Electronic Medical Record) landscape

Landscape in India is at initial stages as most of the hospitals have only HIS.

Emr Journey in other countries has also been very interesting like Middle East hospitals are trying to have national EMR projects by having government funding with it, with naming Hakeem project.

And many other hospitals are at stage 2 -3 in Middle East.

And Indian hospitals although not been judged by HIMSS standard parameters, as that HIMSS are for EMR levels and many Indian hospitals are at HIS level only.

Many hospitals CEO don't know about HIMSS also. And there is a lot of ambiguity in Benefits realization of EMR, as it's been claimed that most of the systems are for private hospitals where rush of patients is less. This perception is becoming stronger by the day that EMR in this present format is tuff to be used in OPD.

If it is to be used in OPD time has to be extended per patient .So hospitals have to decide these things before implementing EMR in hospitals.

The funding required to adopt EMR in hospitals is also a concern.

The thing is ROI. There aren't many ROI studies on the benefits of EMR that's why many hospitals have been facing problems to adopt EMR as many have not realized the benefits.

International perspective

Middle East has money cash rich hospitals and has EMR in there hospitals. Like Cerner has taken contract for Hamad corporation hospitals for EMR in Qatar. And Cerner also has Emr implementations in Egypt .Malaysia government also plans to have paperless hospital in Putrereja hospitals and many hospitals there also planning to have speed miner in there hospitals like Gleneagles hospital.

Globally hospitals are moving towards EMR for better patient safety and operational efficiency.

India Situation

The issue of EMR is much diversified and people views are divided on it.

Small hospitals aspire to have EMR but they don't have money to put in initial investment and many hospitals doctors have their view of not using EMR sometime of excuse of not been technology friendly.

Resulting in delay of EMR implementation in Indian hospitals.

And middle level hospitals in India, they are unclear of how to go about the path Of EMR adoption and benefits are not realized properly by them as yet.

Medical records digitization although is a revolutionary concept but for this the whole scene has to be seen with a fresh perspective with all medical records in E format.

With this there will be an Ease of access of medical history of patients. Clinical trials has to be integrated with it (medical records) as if pharmacy firms can get access to medical data

then they can have better chances of Drug discovery ,as with that they can have targeted drug discovery .

EMR means investment that's why at present only top corporate hospitals with deep cash pockets and administrative control over doctors have successfully implemented the EMR .So hospitals top management is in indecision on whether to acquire EMR or continue with paper works.

EMR features that could prove beneficial to hospitals

A) Patient quality care.
B) Less medication errors.
C) Operation efficiency
D) Centralized data management of records.
E) Better documentation of medical details of patients.
F) Reminders on medication alerts.
G) Possible help in clinical research.
H) Give us the ability to access all medical records from all our locations.
I) Cut transcription costs.
J) Lowers misunderstood notes.
K) Better claim processing with insurance firms.
L) Safety of medical records.

"SWOT" of healthcare IT landscape in Delhi NCR

Strengths

- Majority of hospitals have HIS so its stage 3, now they need to integrate EMR into their systems
- Technical skills of IT professionals.
- Availability of various vendors in healthcare information systems domain.

Weakness

- Negativity around physician use of EMR.
- Less awareness on Benefits of EMR.
- IT been limited to accounts and registration process ,without taking clinical part
- High initial investment and high training cost.
- Clinical, administrative, and financial systems are not linked, and as a result, many healthcare institutions are not yet maximizing their IT potential.
- No standards in India on Healthcare IT.

Opportunity

- Much of hospitals in Delhi NCR have HIS capable of upgrading it to EMR.
- Increase in Quality care of patients IF EMR been used for clinical modules (drug – drug alerts etc.)
- Use in drug discovery and clinical trials from Data mining is opportunity in health IT.

Threat

- High initial cost in EMR
- Negative perception of EMR as being external system.
- Resistance towards adoption of technology.

Issues with EMR adoption

Dr. aren't willing to enter their medical records in their electronic format and medical transcription costs aren't yet ready to handle for the sake of having electronic records so that's why we have such dismal IT adoption in clinical aspects in healthcare.

And proper ROI studies have not been done to help hospitals take decisions to adopt EMR. High Initial investment to adopt EMR. Although, EMR if properly implemented in Delhi NCR Hospitals can change the face of healthcare business.

The patient medical data available to nurse and doctor with a authorized password and login id's .This system can improve operational efficiency in hospitals set up. And data retrieval from patient file by doctor becomes easy by electronic medical record.

E M R health record will help in insurance processes in hospitals also by having all required data in electronic format thus streamlined processes.

Storage cost of these health records are quite high in Delhi NCR citing the high costs for land rates here.

So e records can reduce the amount of paper work.

The loss of medical records may prove costly to hospitals in legal case with EMR in place the valuable health data can be used for preventing loss of such precious health records.

4 Literature Review

Veterans Affairs (VA) has developed and adopted health information technology (IT) systems that support a broad range of patient care and administrative processes. These systems include computerized patient records, or electronic health records; radiological imaging; and laboratory and medication ordering and administration. Known collectively as the Veterans Health Information Systems and Technology Architecture (Vista).

These systems were implemented with the goal of improving patient outcomes and increasing efficiency. It is one of the few health IT– enabled, integrated delivery systems in the United States.

It helps to provide integrated electronic health care with interactive exchange among patients, providers, government agencies, and insurers, resulting in an increase in the overall quality, safety, and efficiency of health care delivery with fewer medical errors, increased administrative efficiency, decreased health care costs, and expanded patient access to affordable health care.

Electronic prescribing can reduce medical errors, decrease in pharmacy costs, improve both prescriber and pharmacy administrative efficiency, eliminate handwriting interpretation

errors, reduce phone calls between pharmacists and physicians, reduce data entry, create electronic records to ensure that prescription information is retained. [1, 2]
Due to these benefits Max hospitals are in the process of implementing EMR Cprs vista systems In India and hospitals like Rajiv Gandhi also trying to adopt EMR Cprs vista.

EMR An electronic medical record (EMR) is a digital version of the traditional paper-based medical record for an individual.
A personal health record for example, is health-related documentation maintained by the individual to which it pertains.

PACS (Picture Archival communication system)

An image as stored on a picture PACS

PACS is a medical imaging technology which provides economical storage of, and convenient access to, images from multiple modalities (source machine types). Electronic images and reports are transmitted digitally via PACS; this eliminates the need to manually file, retrieve, or transport film jackets

RFID Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking.

HIS

The computer hardware and software that processes a hospital's data, including financial, Pt-related, and 'strategic' management data, Pt accounts, Pt tracking, payroll, reimbursements, taxes, statistics.

Benefits of HIS (Hospital information system)

- Easy Access to Patient Data to generate varied records, including classification based on demographic, gender, age, and so on. It is especially beneficial at ambulatory (out-

patient) point, hence enhancing continuity of care. As well as, Internet-based access improves the ability to remotely access such data.

- It helps as a decision support system for the hospital authorities for developing comprehensive health care policies.
- Efficient and accurate administration of finance, diet of patient, engineering, and distribution of medical aid. It helps to view a broad picture of hospital growth
- Improved monitoring of drug usage, and study of effectiveness. This promoting more appropriate pharmaceutical utilization.
- Enhances information integrity, reduces transcription errors, and reduces duplication of information entries.

Components of CPRS (Computerized Physician Record System) VistA

In Pharmacy it has –

- Electronic capturing and reporting of allergies/adverse reactions
- Inpatient and outpatient medications
- Notifications/patient record flags
- Orders for medications
- Order checking etc.
- Reduced inpatient costs for preventable adverse drug events caused by inpatient medications.
- Reduced inpatient costs for preventable adverse drug events caused by outpatient medications.
- Reduced outpatient visit costs for preventable adverse drug events caused by outpatient medications.

Also concerned to Vista Pharmacy can also do real-time, point-of-care validation for administration of unit dose and IV medications.

BCMA (Bar Coded Medication Administration)

This is done by BCMA i.e. Bar Code Medication Administration, a component of Vista. This helped in reducing inpatient costs for preventable adverse drug events caused by inpatient medication administration errors.

Medication errors reduction by CDSS(Clinical decision support system)

CDSS (**CDSS**) is an interactive decision support system (DSS) .Computer Software, which is designed to assist physicians and other health professionals with decision making tasks, as determining diagnosis of patient data.

The main purpose of modern CDSS is to assist clinicians at the point of care. This means that a clinician would interact with a CDSS to help determine diagnosis, analysis, etc. of patient data.. The methodology of using CDSS to assist forces the clinician to interact with the CDSS utilizing both the clinician's knowledge and the CDSS to make a better analysis of the patients data. Typically the CDSS would make suggestions of outputs or a set of outputs for the clinician to look through and the clinician officially picks useful information.

There are two main types of CDSS

- Knowledge-Based
- Non Knowledge-Based

Doctors use these systems at point of care to help them as they are dealing with a patient.

Pre-diagnoses CDSS systems are used to help the physician post-diagnoses CDSS systems are used to mine data to derive connections between patients and their past medical history and clinical research to predict future events.

One of most important thing to be taken into consideration is that use of CDSS helps in reduction of the medication errors.

Due to poor handwriting and possible drug or allergy interactions with the prescribed medication many medical errors occur.

The world EHR comes with a sophisticated drug-drug, drug-allergy, and drug-lab monitoring check system. This feature is automated within EHR and has been proven to reduce medication errors.

The institute of medicine has reported that preventable medication errors result in at least 1.5 million ADES and 7,000 deaths each year in the United States.

E-prescribing is expected to reduce these errors in a variety of health care settings. The results of a study of the potential impact of CPOE on prescribing errors in a 700-bed academic medical hospital indicated that 64.4% of all verified prescribing errors were likely to be prevented with CPOE, including 43% of the potentially harmful errors.

A 2008 retrospective review of 10 studies in hospital and ambulatory settings showed that CPOE (Computerized physician order entry (CPOE) (also sometimes referred to as *Computerized Provider Order Entry*) is a process of electronic entry of medical practitioner instructions for the treatment of patients (particularly hospitalized patients) under his or her care. CPOE reduces errors related to handwriting or transcription, allows order entry at point-of-care or off-site, provides error-checking for duplicate or incorrect doses or tests, and simplifies inventory and posting of charges contributed to a statistically significant decrease in ADES in 50% of the studies.

Studies on "homegrown" systems, studies comparing manual chart review to detect errors, and studies comparing e-prescribing with handwritten prescribing seemed to show a higher relative risk reduction than other studies.

Also the system uses Bar Code Technology to stock, pick and return medications to reduce medication errors.

A **barcode** is an optical machine-readable representation of data, which shows data about the object to which it attaches. Originally barcodes represented data by varying the widths and spacing's of parallel lines.

They are generally referred to as barcodes as well. Barcodes originally were scanned by special optical scanners called barcode readers; became available on devices including desktop printers .

Computerized physician order entry (CPOE) systems are electronic prescribing systems where prescribers enter orders into a computer, replacing handwritten orders on paper. CPOE

can significantly reduce medication errors, since past research found the majority of medication errors, 39%, occurred at the ordering stage in the medication use system.

CPOE replaces hand written prescriptions and hand transcribing of the prescription, eliminating procedures that can introduce medication errors.

Research has shown that prescriptions ordered electronically have lower error rates than handwritten prescriptions. When compared the error rates for handwritten versus computer-assisted prescriptions, it was found that, 2.3% medication error rate existed for handwritten prescriptions, with 3.9% needing clarification compared to a 7% error rate and 0.8% clarifications needed for computer-assisted prescribing.

Medication administration records generated automatically as part of a pharmacy management system can reduce medication errors because of increased accuracy and legibility, preventing errors at the transcribing stage where 12% of errors occur. CPOE standardizes orders by forcing prescribers to include a dose, route and frequency for each prescription entered.

Recent research has shown that health information technology in hospital pharmacies can reduce medication errors. Anderson et al (2002) used a computer simulation model to show that implementation of a comprehensive medication delivery system designed to detect and prevent ADES could save 1,226 days of hospitalization and $1.4 million annually, even if the system only prevented 26% of medication errors.

EMR Adoption Model

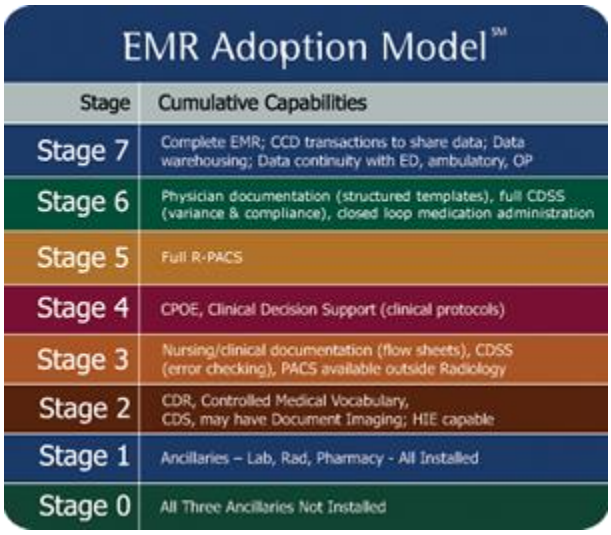


Fig 1: Stages for EMR Adoption (HIMSS Model)

EMR Adoption Model Structure Ensures Objectivity:

- All application capabilities within each stage must be operational before that stage can be achieved.
- All lower stages must have been achieved before a higher level will be considered as achieved.
- A hospital can achieve better EMR adoption if it has met all of the application requirements for a single patient care service (e.g. single nursing floor, cardiology service).
- Using the rules above, additional points are given for the implementation of applications in stages higher than the one fully achieved by the healthcare organization.. In this fashion, other implementation paths than those prescribed by the stages can be taken into consideration for correlation with quality and financial research.

I at Kasper Consultancy have used this EMR model for India context and divided hospitals in 5 stages according to their technology adaptation.

As stage 1 hospital have only Registration, Appointment, and Scheduling.

As stage 2 hospitals have only IT in Lab, Pharmacy Radiology, and basic PACS.

As stage 3 hospitals have only HIS (without clinical module), Inventory, patient billing, bed allocation.

As stage 4 hospitals have only HIS (with clinical modules), medication orders, CDSS.

As stage 5 hospitals have CPOE (Computerized Physician Order Entry), Full PACS, and BCMA.

Stage 5 being the most technology advanced stage for any hospitals .And 70-80% hospitals come in stage 3 been the HIS without clinical module and only Few hospitals having EMR,so clearly there are many issues otherwise such low acceptance of EMR would not have been possible.

5. Objective

The objective of this project is to study:

- To understand the usage of technology and IT in Delhi NCR hospital.
- Having a quantitative data on technology wise assessment of hospitals according to stage and bed size.
- Analysis of No. of beds Vs Stage of modified HIMSS (India's context).

6. Study Design

The study is divided in following stages**:**

- Study of the Healthcare IT implementation across Middle East countries.
- Study the 7 stage HIMSS Model for EHR Adoption.
- Survey on "Level of prevalence of Healthcare IT in hospitals across Delhi and NCR.".
- Compilation of the data and data analysis.
- Finding / Understanding the Health IT landscape of hospital across Delhi and NCR region.

7 Methodology

Sample

- 31 hospitals were taken for the study
- It had both private as well as govt. hospitals.
- Sample was taken by convenient sampling in Delhi NCR region.
- Demography of the respondent
- The Respondents are doctors, CEO, administrators, IT department heads and nursing staff.

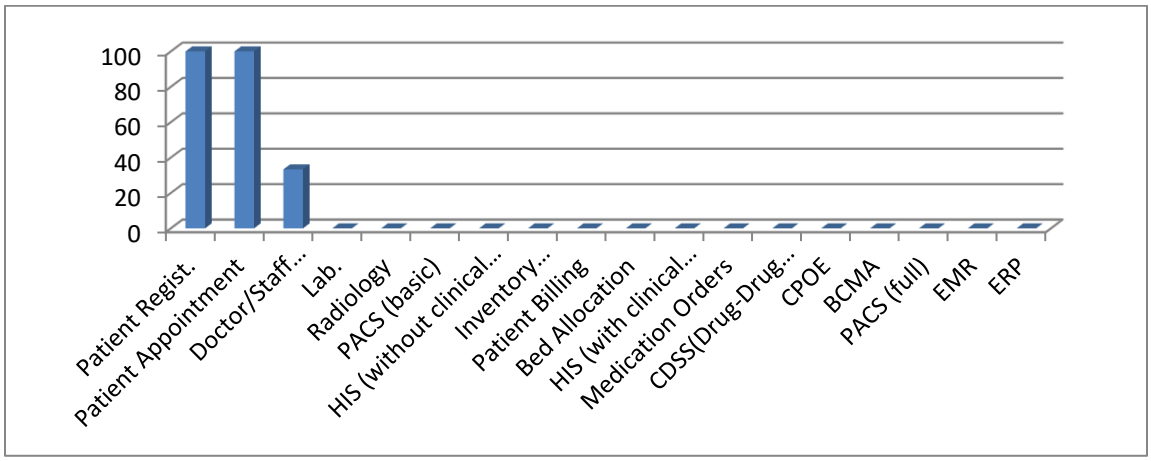
Tools

- Survey was conducted with the help of the questionnaire as the study
- Data was coded and analyzed in MS Excel version 2007 including the application of graphical representation.

Study was basically an exploratory study using a mixed data, both qualitative and quantitative.

8. Results on Analysis

Graph1 0-50 BED RANGE ANALYSIS.



0-50 bed range

Interpretations.

In this patient registration is done along with patient appointment.

Clearly they don't have the usage of CPOE or HIS and EMR.

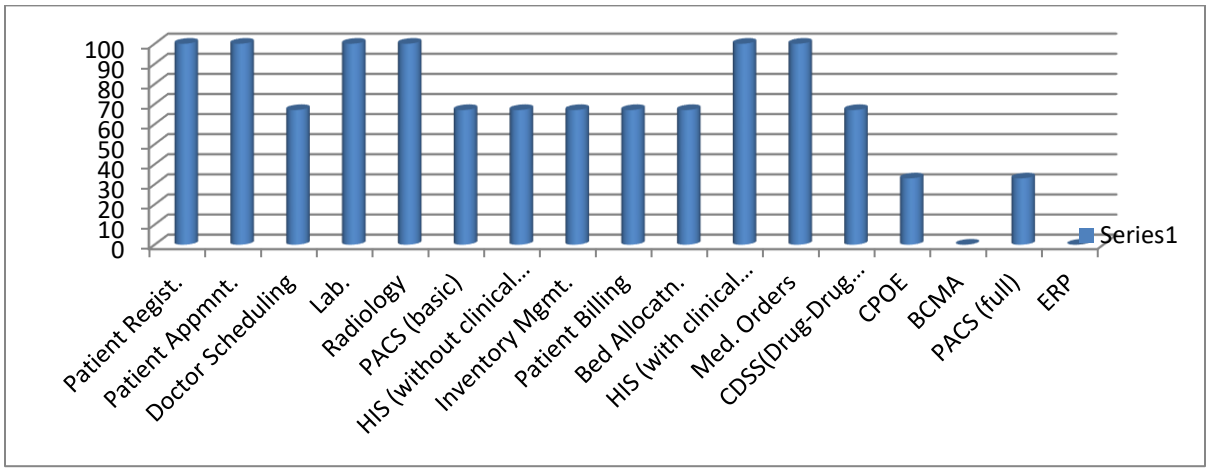
50 -200 Bed range hospitals

Interpretations

They have HIS mostly and Clinical part is missing mainly here in this bed range.

200-300 hospitals Range

Graph 2



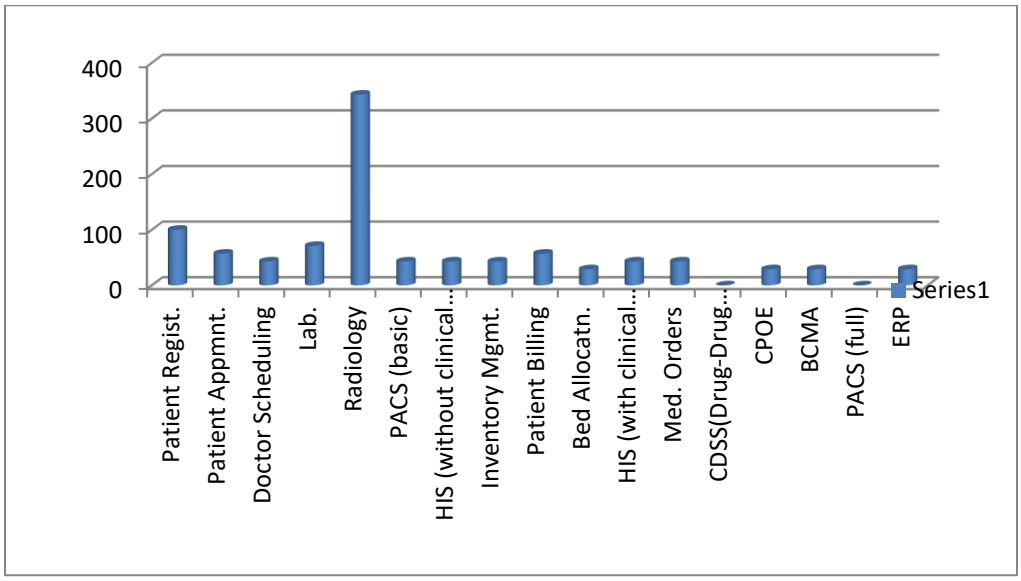
Interpretations

They have IT in labs and radiology.

They have all the basic features like patient registration, appointments

Bed range 300 and above.

Graph 3



.

Bed range 300 and above.

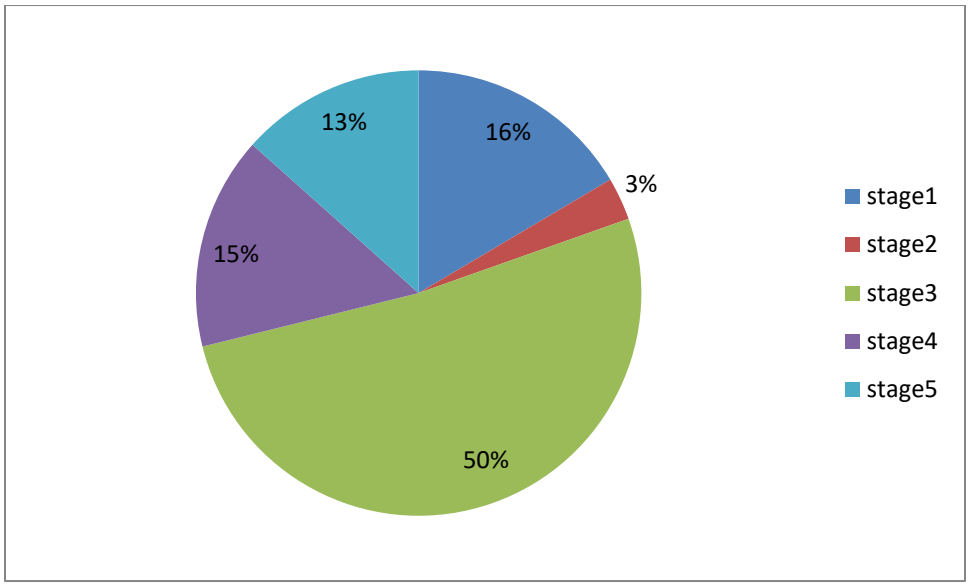
Interpretations.

These large hospitals have small percentage of HIS as some of the hospitals in this category belong to Govt run hospitals.

Hospitals according to stages

- 50 % of the hospitals are in stage 3.
- 16% are in stage 4 and stage 1

Graph 4



Stage 1 Analysis

List of hospitals in stage 1

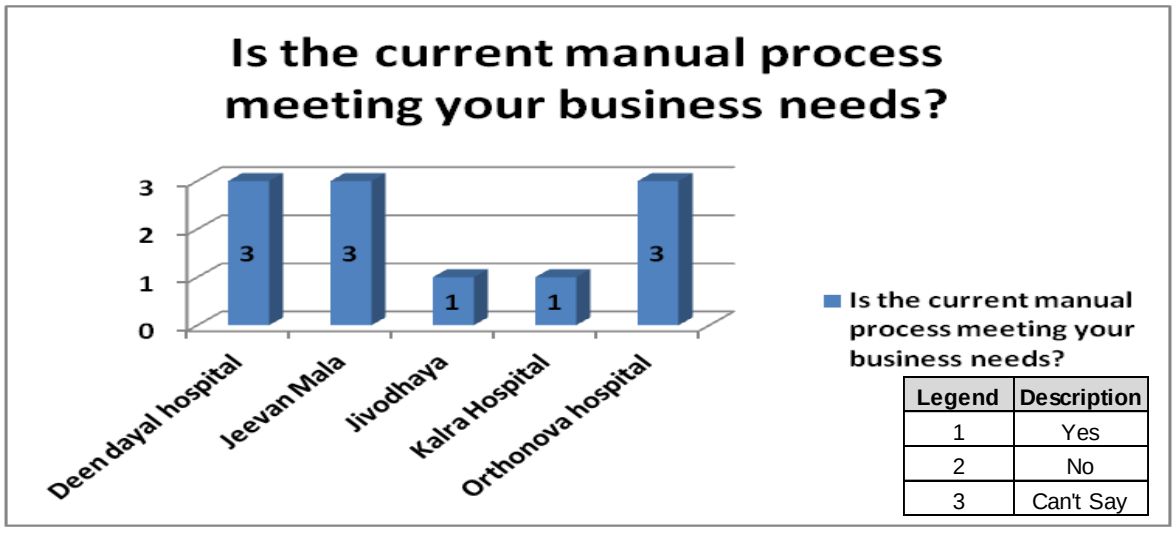
- Deen dayal upadhya stage 1 500 bed
- Jeevan Mala Hospital stage 1 30 beds
- Jivodhaya Hospital stage 1 45 beds
- Kalra Hospital stage 1 150 beds
- Orthonova Hospitals stage 1 40 beds

Features of Hospitals in stage 1

- They Have basic patient registration
- They have Patient appointment
- They have Dr .scheduling

Feel the need of IT in lab &radiology	**Name of Hospitals**
yes	Jiyodhya,Jeevanmala
no	Kalra hospital
can't say	Orthonova,Deen Dayal upadhya

Graph 5

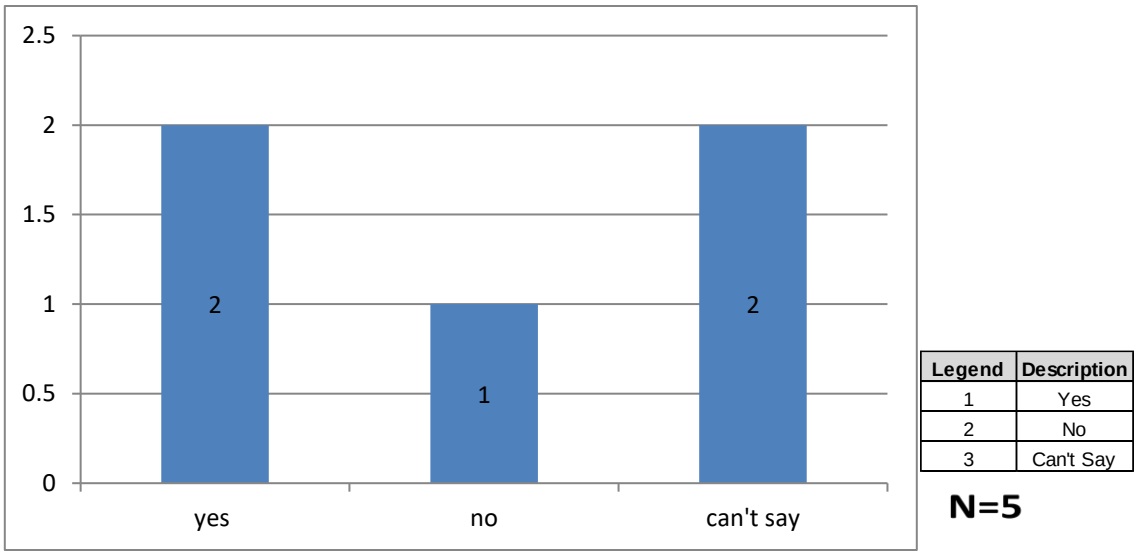


Interpretation

Q. Is the current manual process meeting your business needs?

- 60% of stages 1 hospital is unsure of this question.
- Remaining hospitals of stage1 hospital are favoring their manual process to need their current business need.

Graph 6

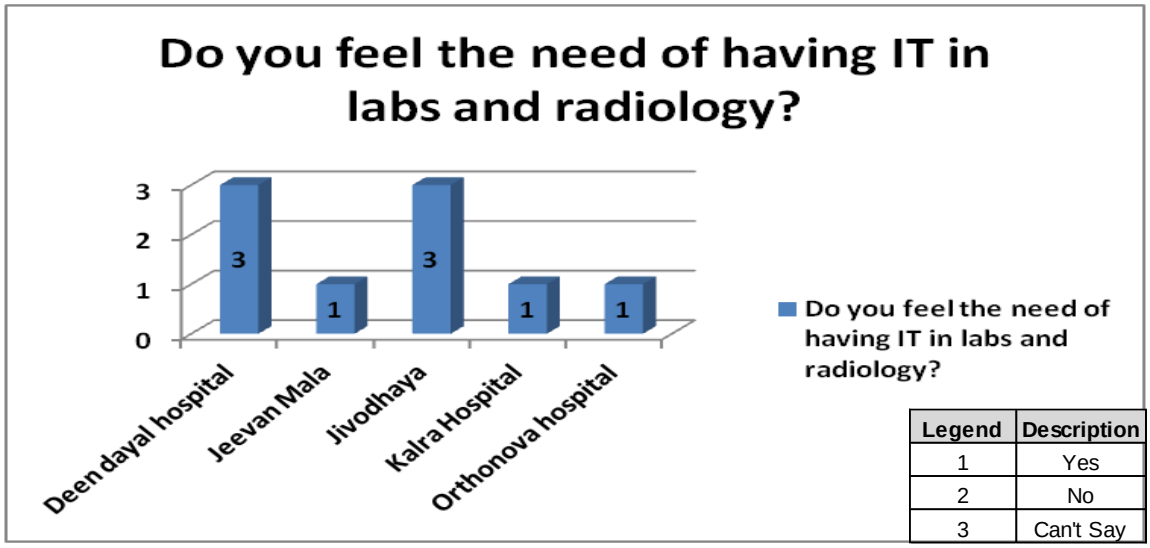


Interpretation

Q. IS the present TAT is satisfactory in labs for your hospitals?

- 2 hospitals saying yes were Jeevanmala and Jiyodhaya .
- 1 hospital saying No was Kalra hospital.
- 2 Hospitals saying can’t say were Deen dayal and orthonova.

Graph 7

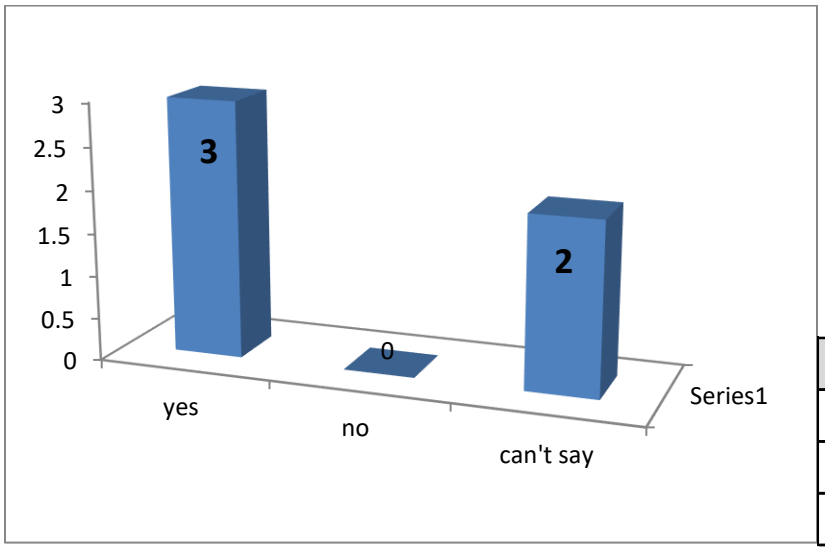


Interpretation

Q. Do you feel the need of having IT in labs and radiology?

- Majority 60% hospitals feels there's a need for IT systems in their lab and radiology departments.
- Remaining hospitals are not sure for their IT needs in the hospital lab and radiology department.

Graph 8



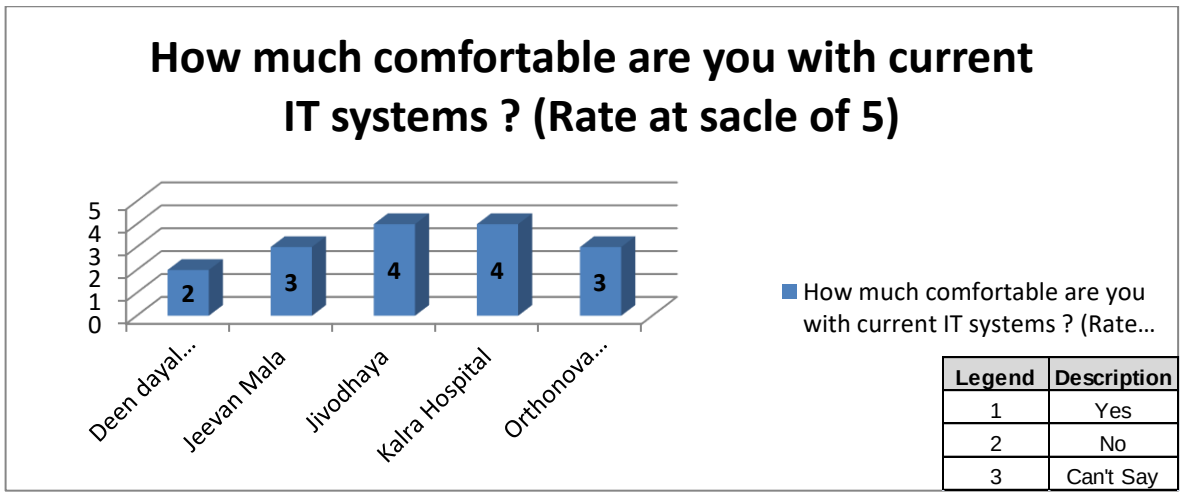
Legend	Description
1	Yes
2	No
3	Can't Say

Interpretation

Q. Are you satisfied with your inventory management system?

- 3 Hospitals saying yes were Jeevanmala, Kalra and Orthonova Hospital.
- 2 Hospitals saying can't say were Deendayal and Jiyodhaya hospital.

Graph 9



Legend	Description
1	Yes
2	No
3	Can't Say

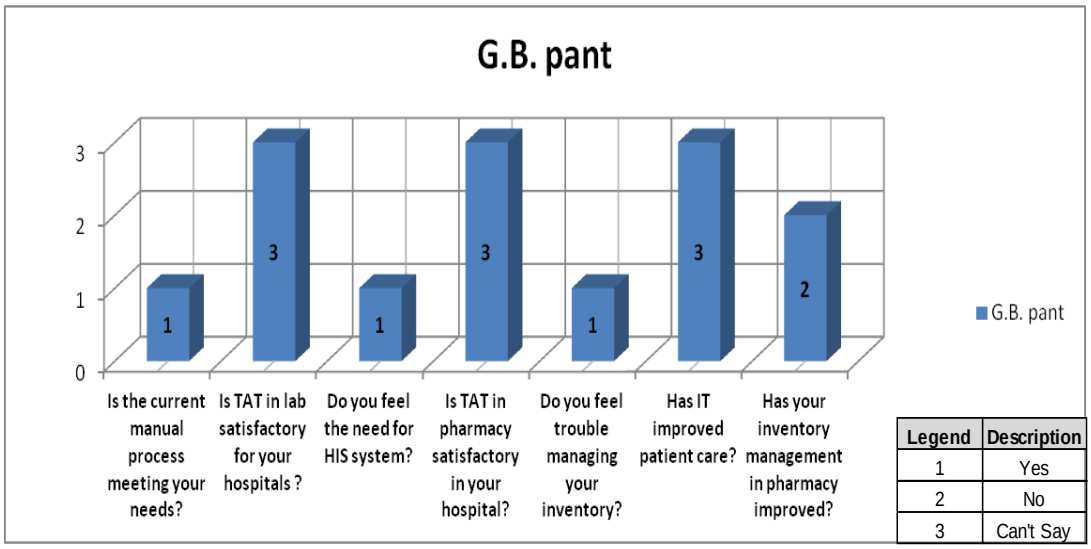
Interpretation

Q. How much comfortable are you with current IT systems?

- Majorly all hospitals were comfortable using their current IT systems.

Graph 10

Stage 2

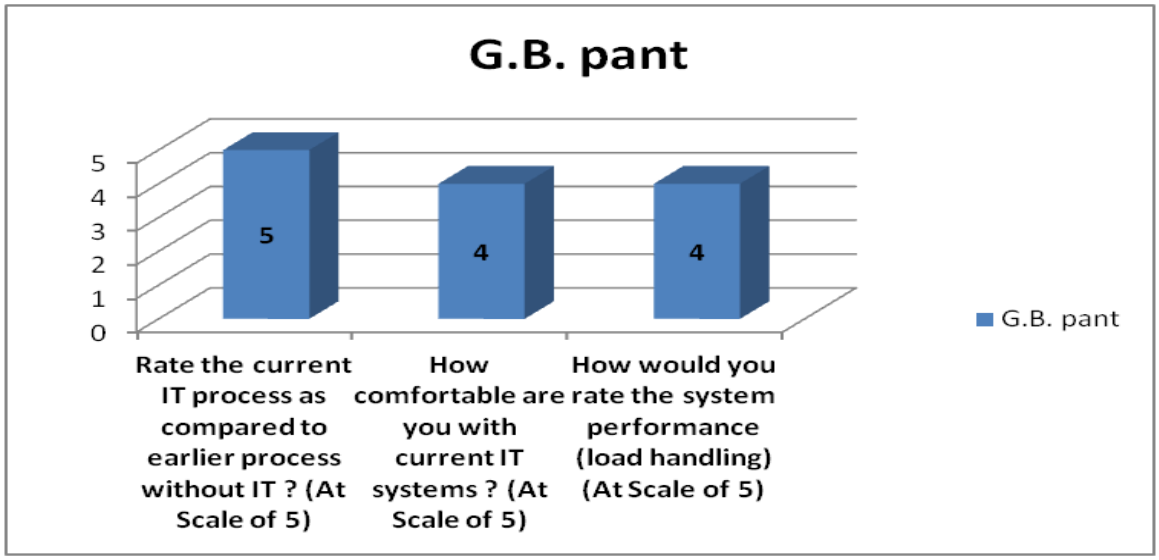


Interpretation

Q. How much comfortable are you with current IT systems?

- The hospital believes current manual process is meeting their business needs.
- Hospital is not sure for level of satisfaction of TAT for labs.
- Hospital strongly believes there's need for HIS system to help improve their efficiency.
- Hospital feels that they face a operational difficulty in managing their inventory.
- Hospital is not sure whether IT system will help in improving patient care.

Graph 11



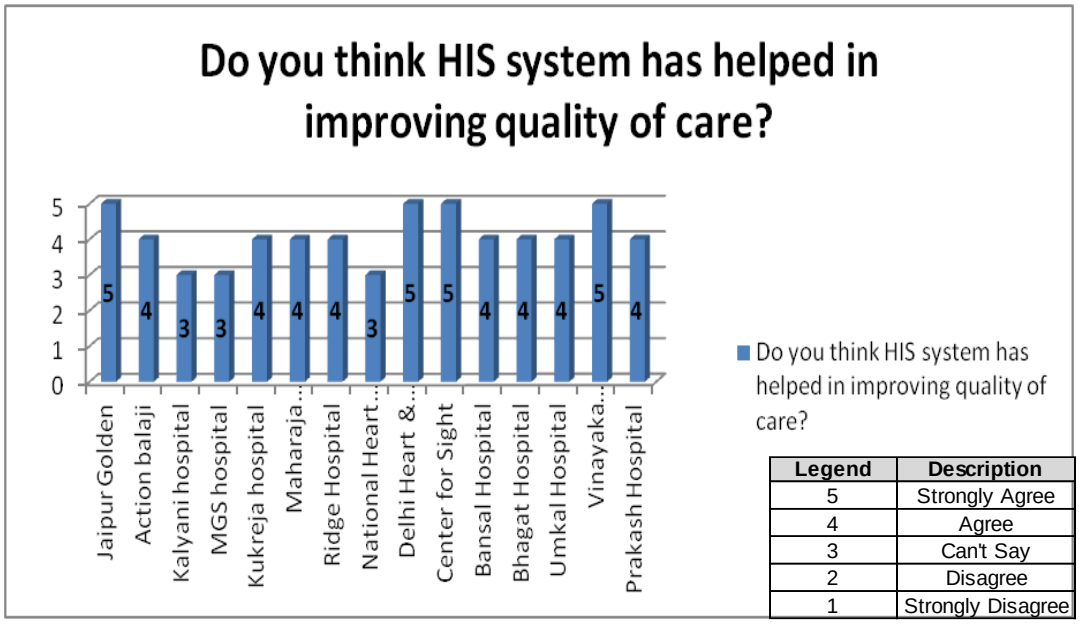
Interpretation

Q. Rating questionnaire

- This Hospital is found to be satisfied with their current IT system and also in terms of load handling and system performance.

Graph 12

Stage 3

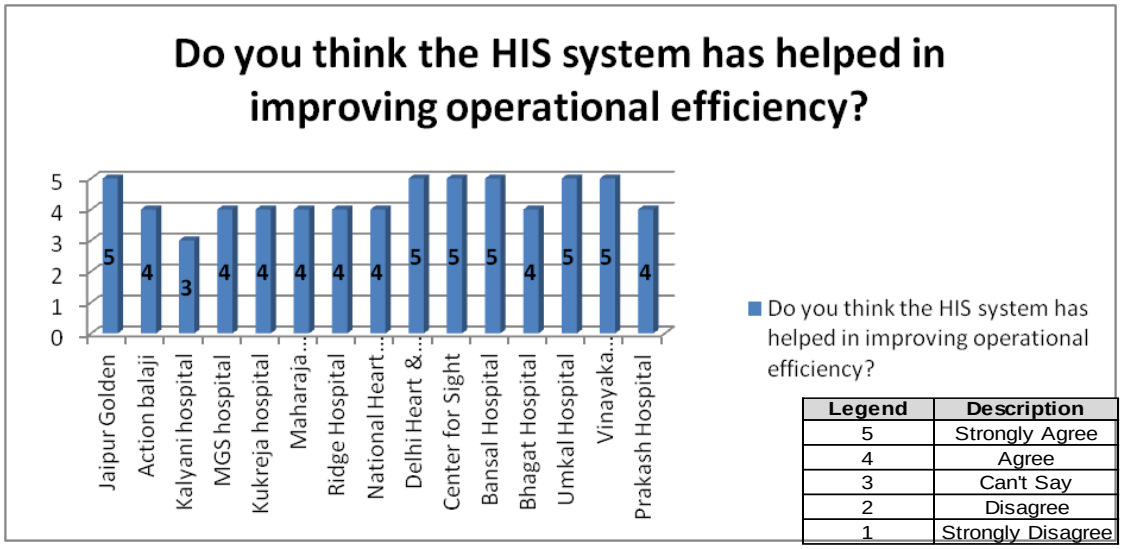


Interpretation

Q. Do you think HIS system has helped in improving quality of care?

- 27% of hospitals strongly agree that HIS system has help in improving quality care.
- 53% of stage 3 hospitals agree that HIS system has help in improving quality care.
- 20% of stage 3 hospitals are sure whether HIS will help in improving quality care.

Graph 13

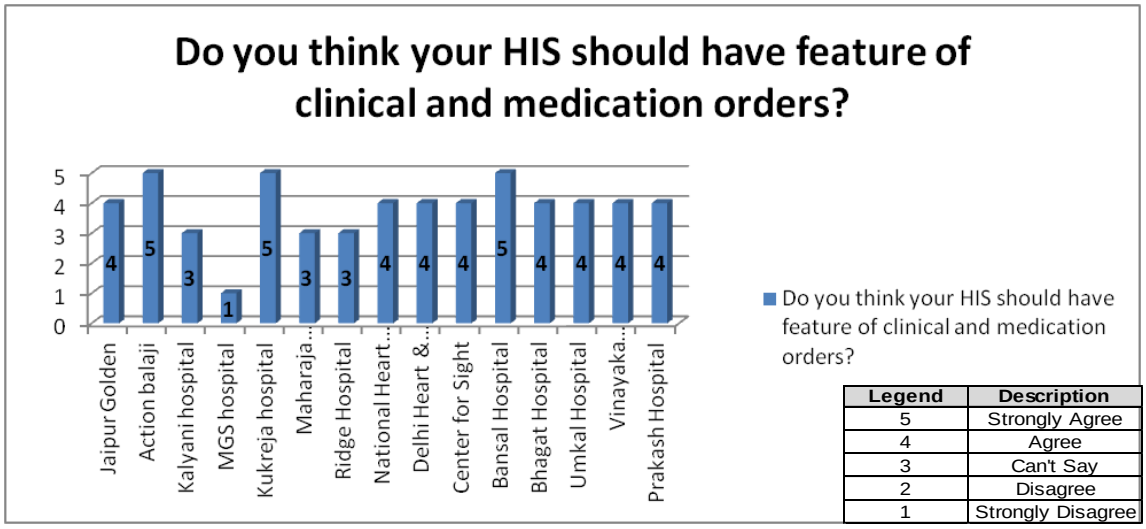


Interpretation

Q. Do you think the HIS system has helped in improving operational efficiency?

- 40% of Stage 3 hospitals strongly agree that HIS system has helped in achieving operational efficiency.
- 53% of Stage 3 hospitals agree that HIS system has helped in achieving operational efficiency.
- 7% of Stage 3 hospitals were not sure about efficiency improvement through the use of HIS system.

Graph 14

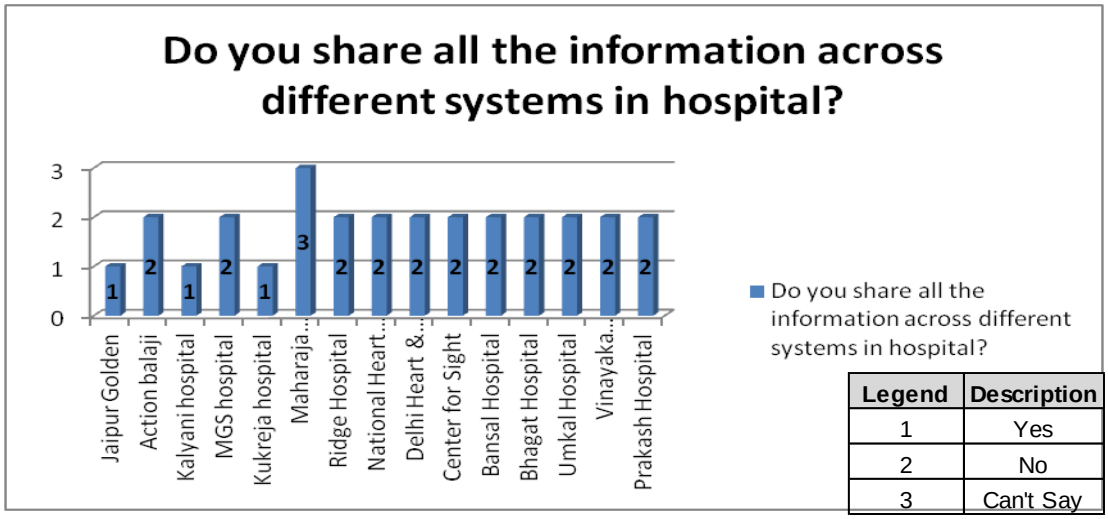


Interpretation

Q. Do you think your HIS should have feature of clinical and medication orders?

- 20% of Stage 3 hospitals strongly agree with having clinical features and medication order.
- 53% of Stage 3 hospitals agree with having clinical features and medication order.
- 20% of Stage 3 hospitals are not sure will clinical features and medication order help in operational process.
- 7% of Stage 3 hospitals strongly disagree with having clinical module in their HIS system.

Graph 15

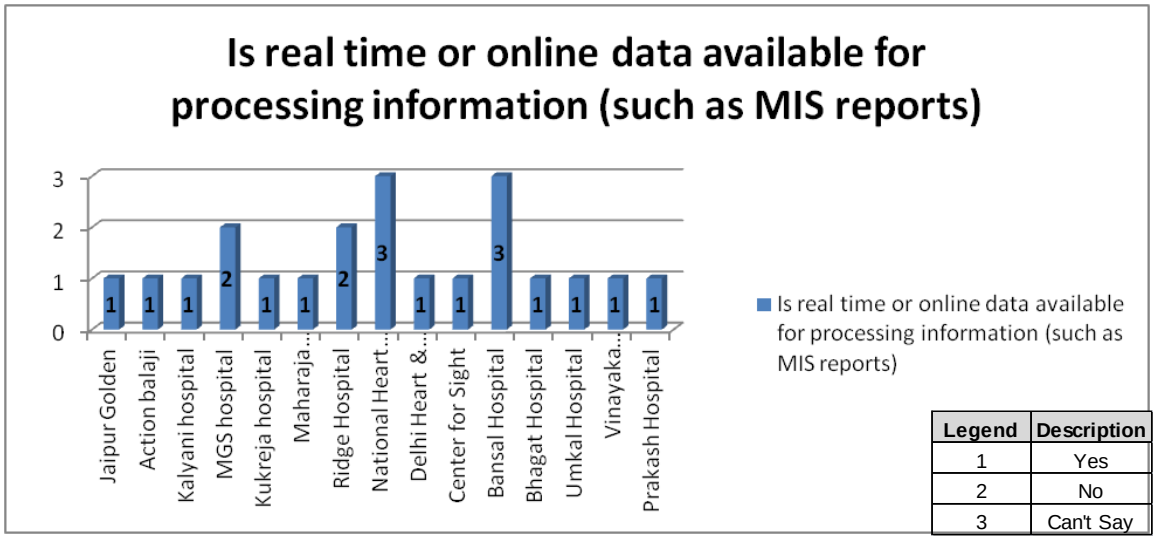


Interpretation

Q. Do you share all the information across different systems in hospital?

- 73% of Stage 3 hospitals didn't share all information across the hospital using current IT systems.
- 20% of Stage 3 hospitals share all information across the hospital using current IT systems.
- 7% of Stage 3 hospitals were not sure whether they share all information across the hospital using their current IT systems.

Graph 16

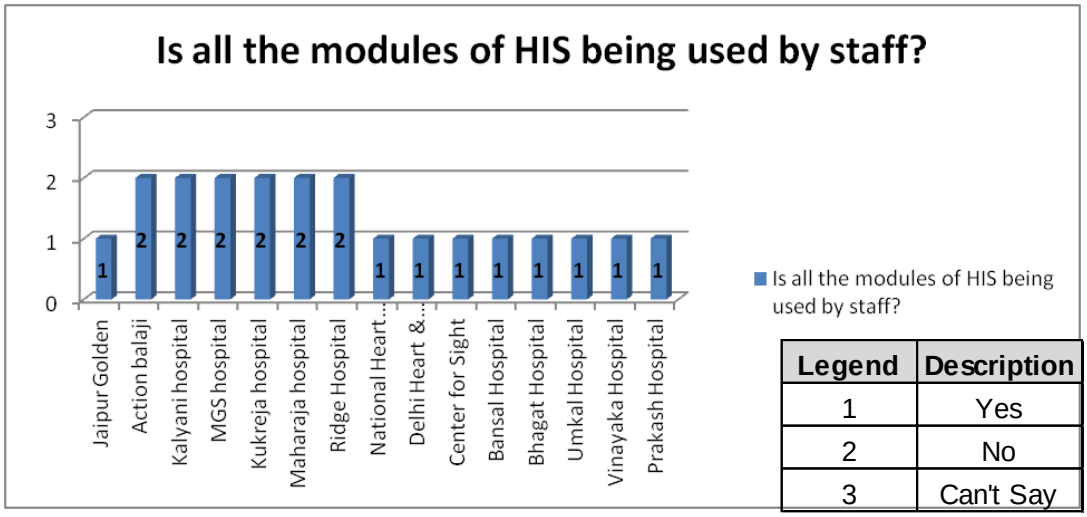


Interpretation

Q. Is real time or online data available for processing information (such as MIS Reports)

- 73% of stage 3 hospitals use real time data for MIS report generation.
- 13% of stage 3 hospitals do not use real time data for MIS report generation.
- 13% of stage 3 hospitals are not sure whether real time data is available for MIS report generation.

Graph 17

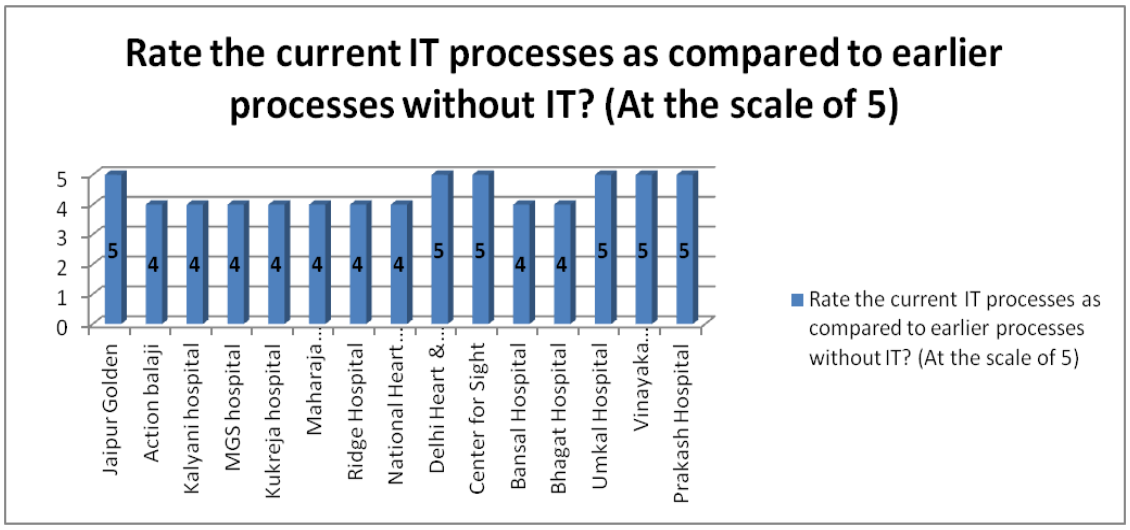


Interpretation

Q. Is all the modules of HIS being used by staff?

- 60% of stage 3 hospitals agree of using all the modules of their current HIS system.
- 40% of stage 3 hospitals disagree of using all the modules of their current HIS system.

Graph 18

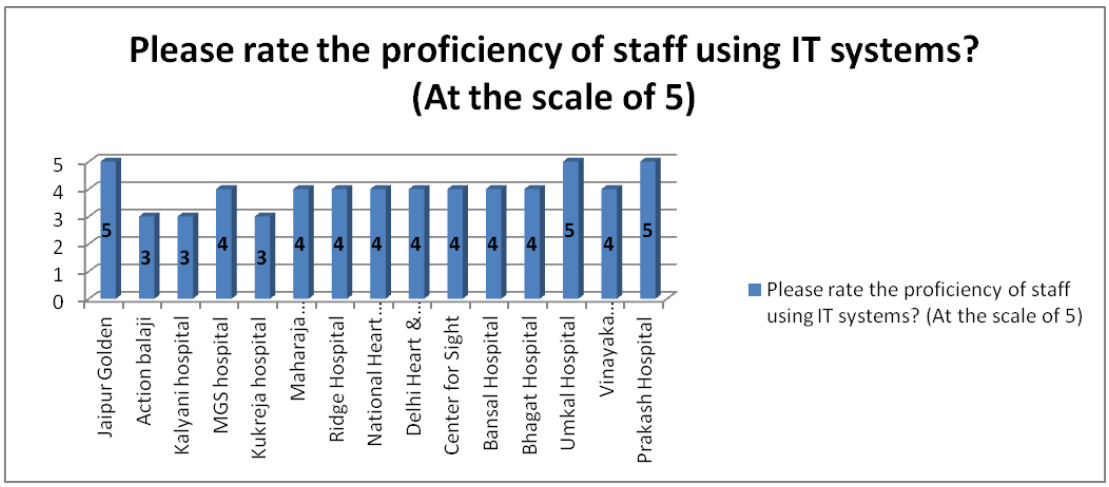


Interpretation

Q. Rating questionnaire

- Hospital has highly rated their new business process against older practices in a non IT environment.

Graph 19

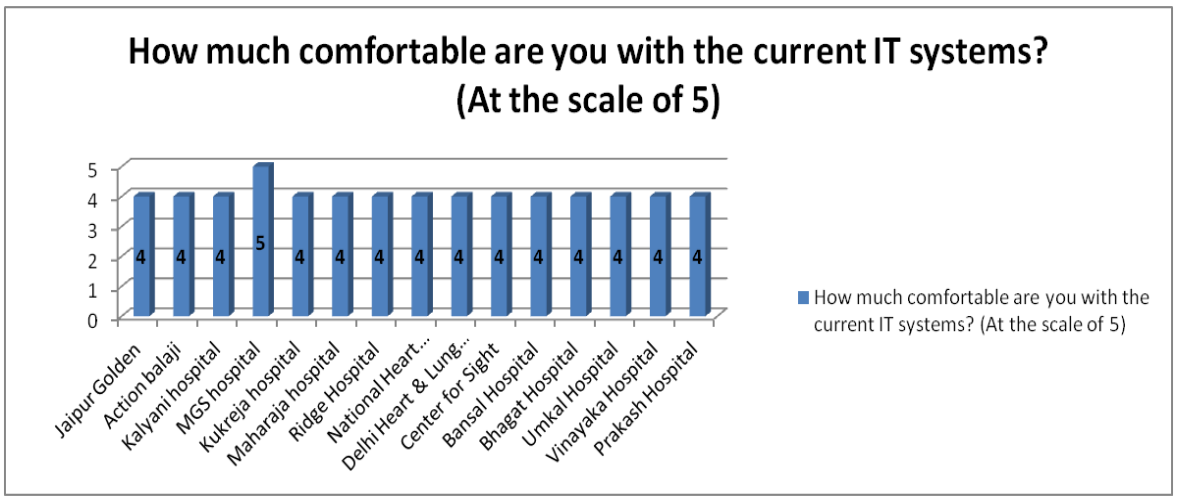


Interpretation

Q. Rating questionnaire

- Hospitals have highly rated the proficiency level of their staff using current IT systems.

Graph 20



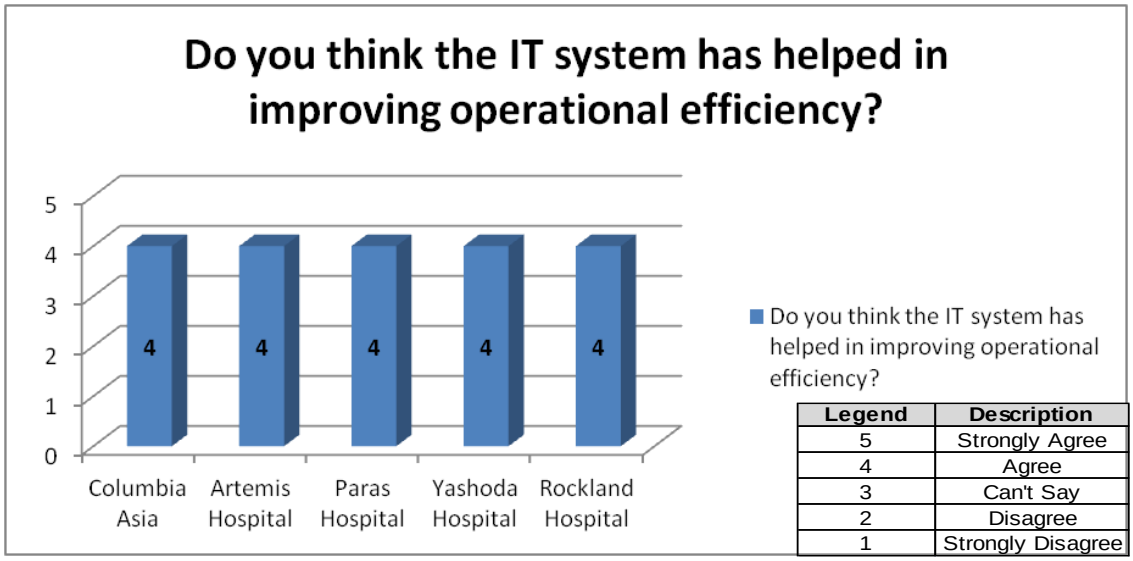
Interpretation

Q. Rating questionnaire

- Hospitals have reported high comfortableness for the usage current IT systems.

Graph 21

Stage 4

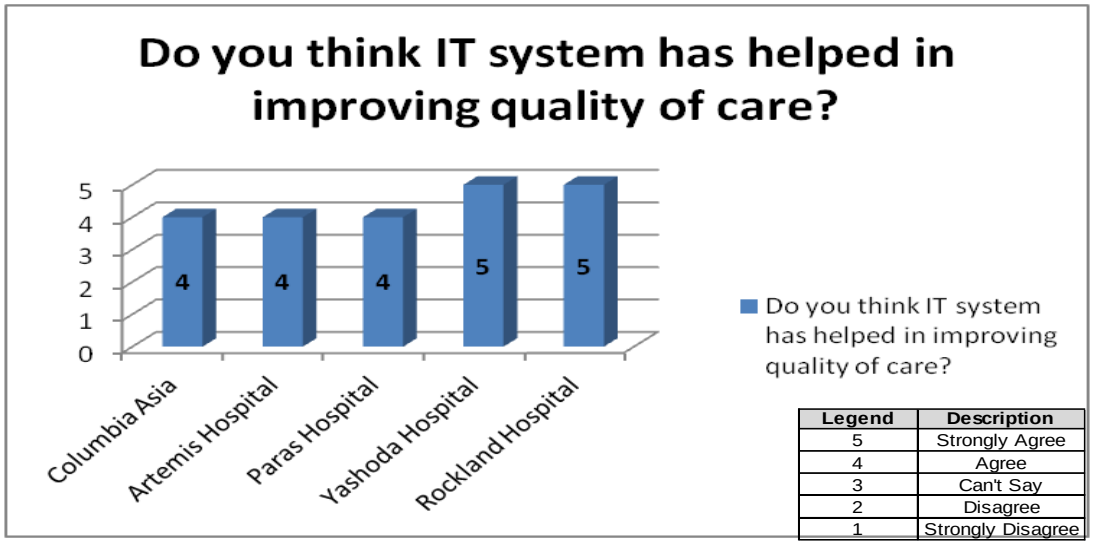


Interpretation

Q. Do you think the IT system has helped in improving operational efficiency?

- 100% of Stage 4 hospitals agree that HIS system has helped in achieving operational efficiency.

Graph 22

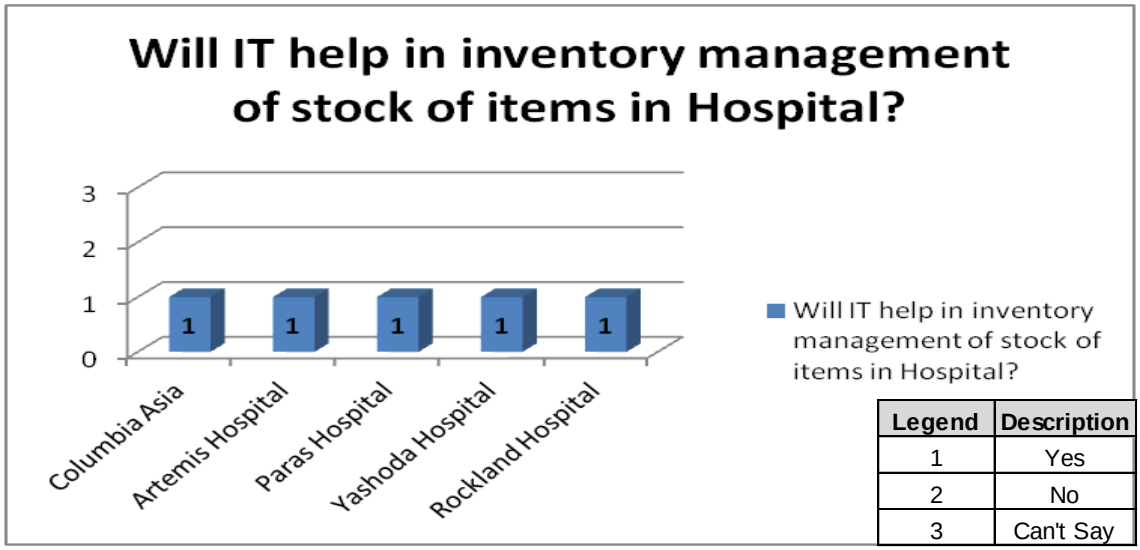


Interpretation

Q. Do you think IT system has helped in improving quality of care?

- 40% of stage 4 hospitals strongly agree that HIS system has help in improving quality care.
- 60% of stage 4 hospitals agree that HIS system has help in improving quality care.

Graph 23

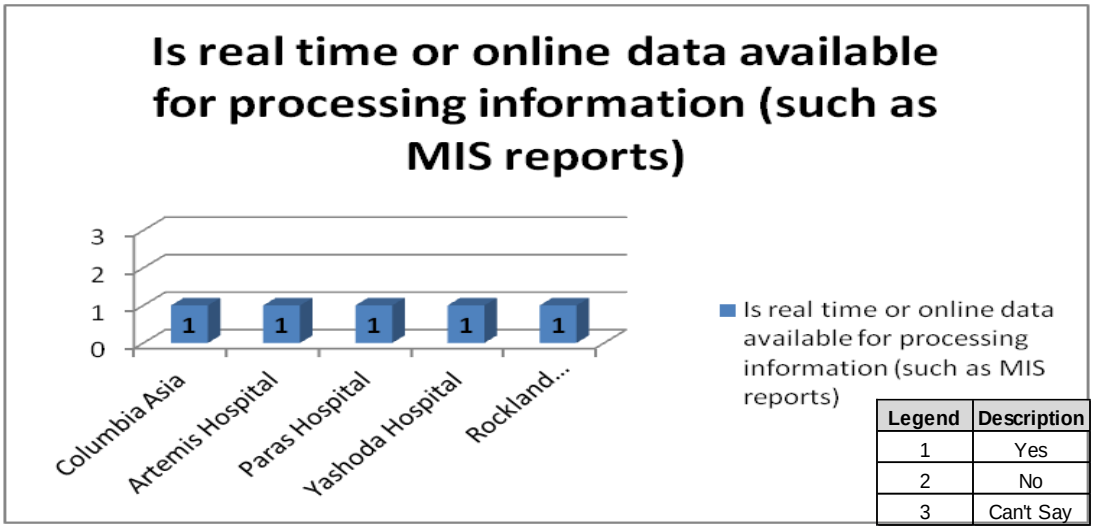


Interpretation

Q. Will IT help in inventory management of stock of items in Hospital?

- 100% of stage 4 hospitals believe that IT system will help in inventory management of stock within hospital.

Graph 24

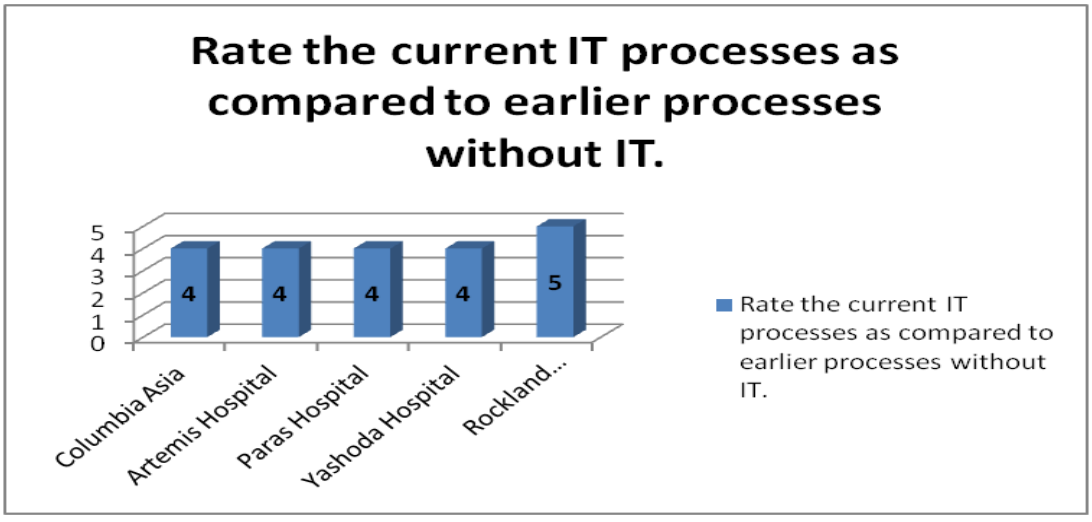


Interpretation

Q. Is real time or online data available for processing information (such as MIS REPORTS?)

- 100% of stage 4 hospitals use real time data for MIS report generation.

Graph 25

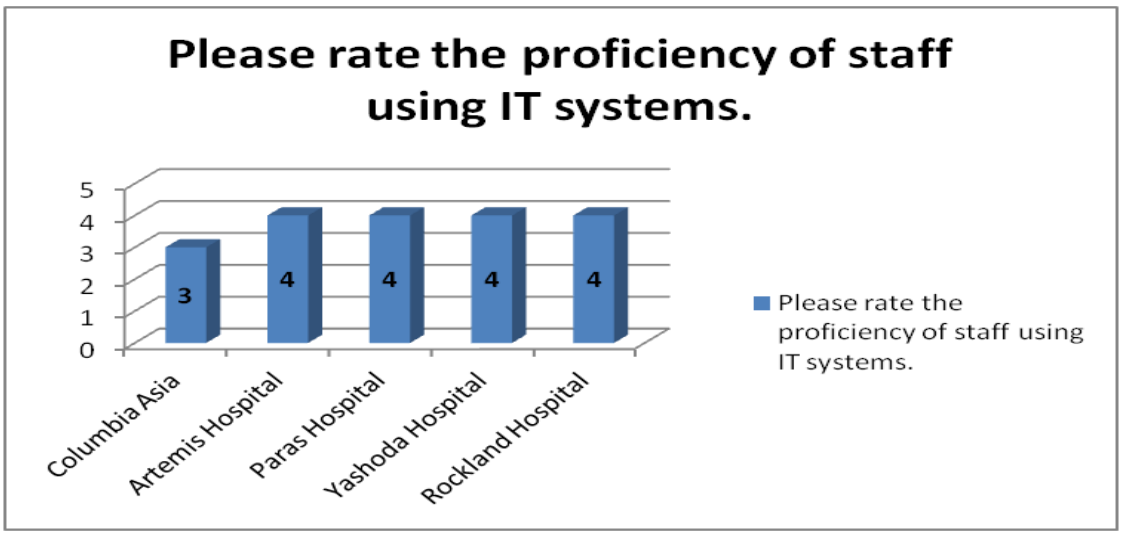


Interpretation

Q. Rating questionnaire

- Hospital has highly rated their new business process against older practices in a non IT environment in terms of efficiency.

Graph 26

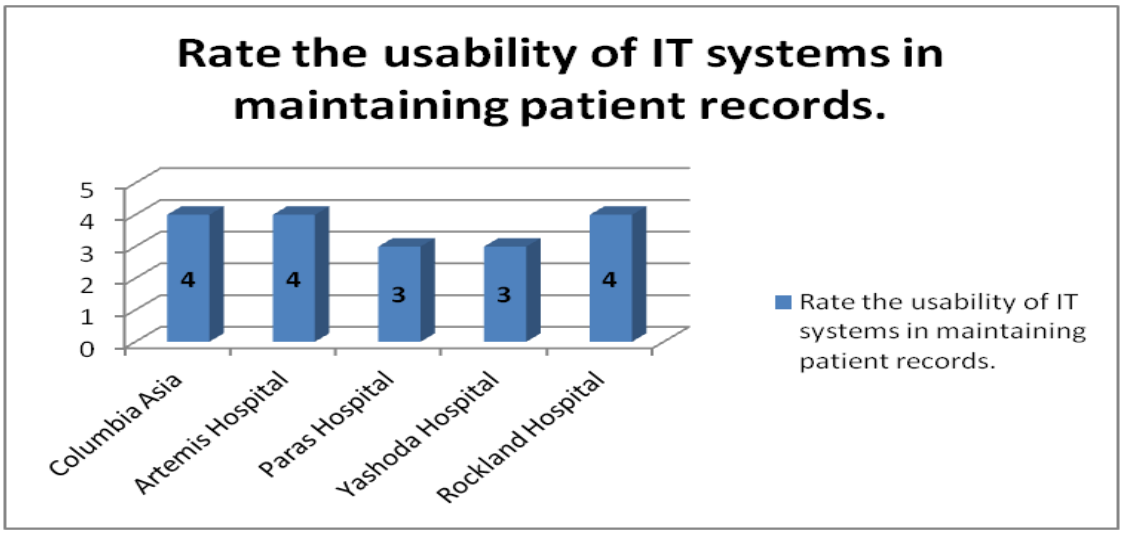


Interpretation

Q. Rating questionnaire

- Hospitals rated high proficiency level of their staff using current IT systems.

Graph 27



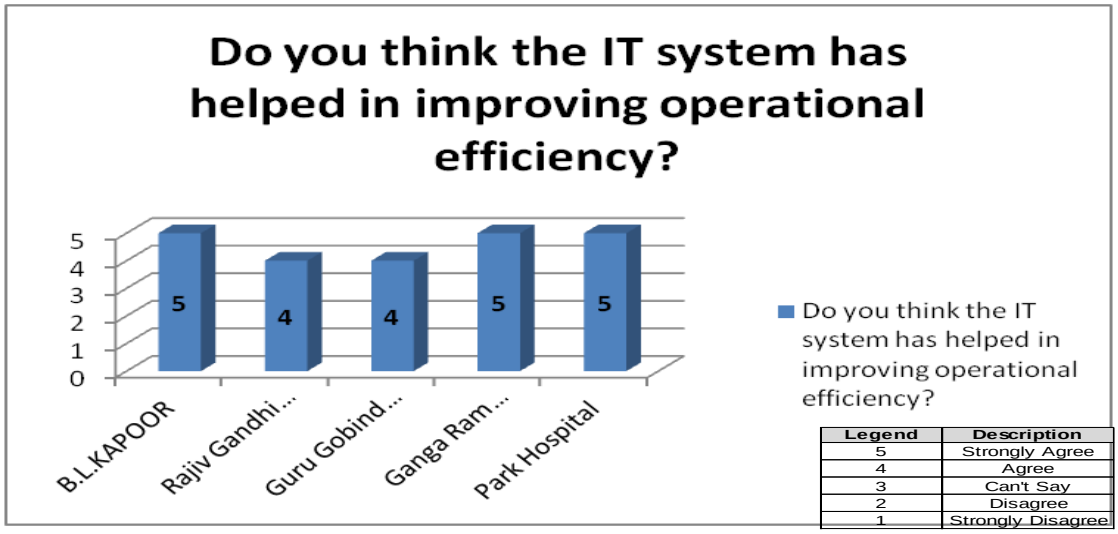
Interpretation

Q. Rating questionnaire

- Hospitals rated high usability level of IT systems in maintain patient records.

Graph 28

Stage 5

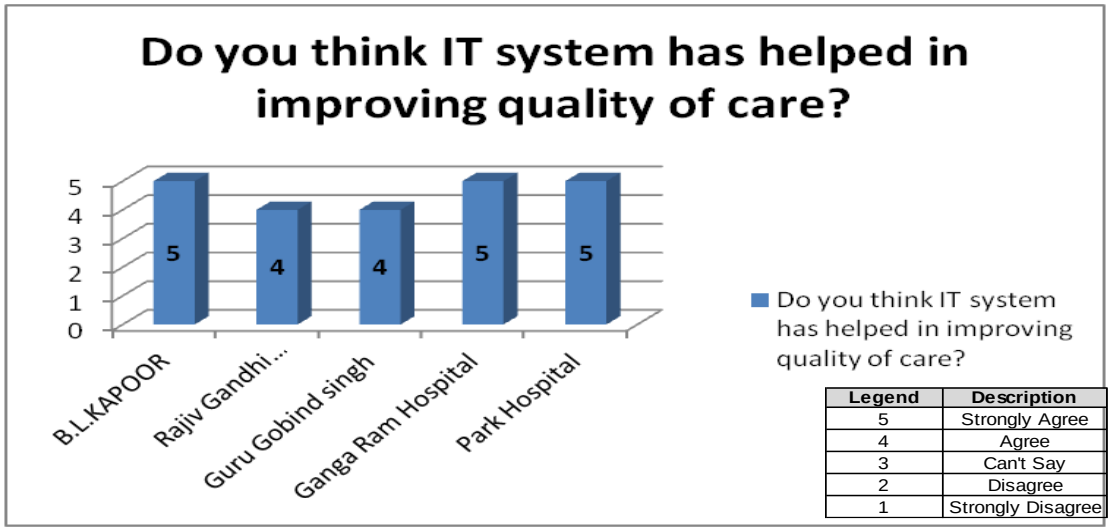


Interpretation

Q. Do you think the IT system has helped in improving operational efficiency?

- 60% of Stage 5 hospitals strongly agree that HIS system has helped in achieving operational efficiency.
- 40% of Stage 5 hospitals agree that HIS system has helped in achieving operational efficiency.

Graph 29

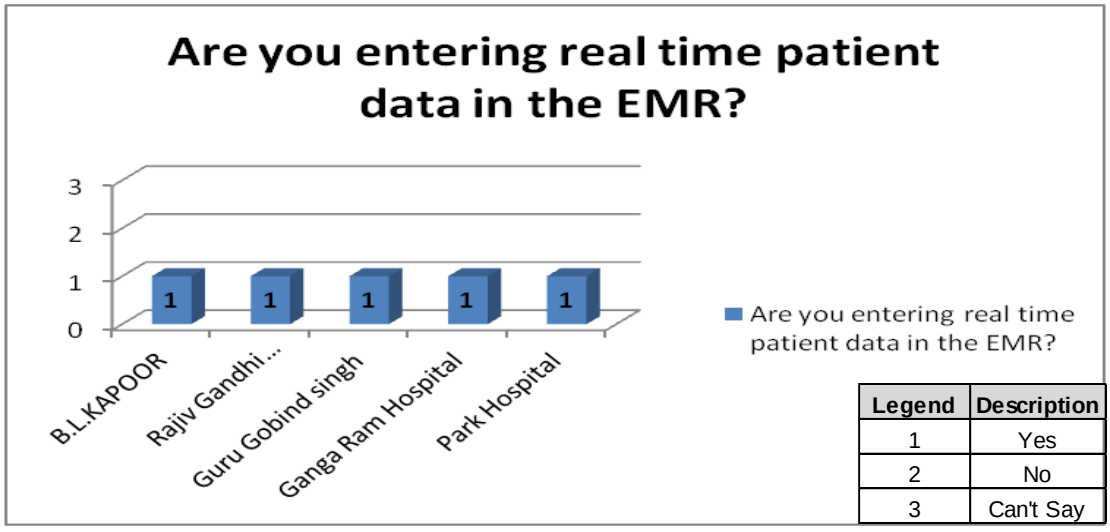


Interpretation

Q. Do you think IT system has helped in improving quality of care?

- 60% of stage 5 hospitals strongly agree that HIS system has help in improving quality care.
- 40% of stage 5 hospitals agree that HIS system has help in improving quality care.

Graph 30

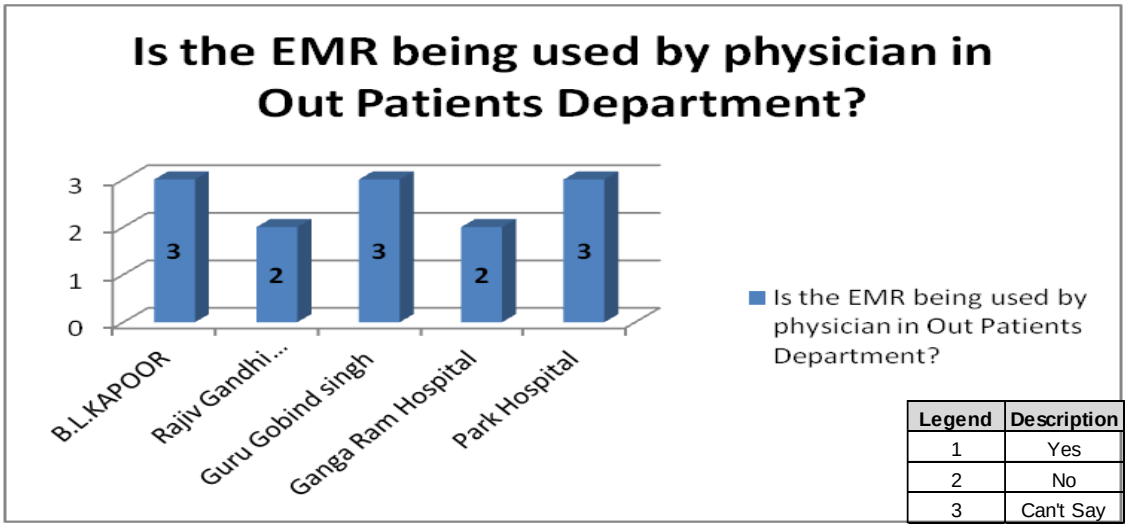


Interpretation

Q. Are you entering real time patient data in the EMR?

- 100% of stage 5 hospitals are entering real time data onto the EMR system.

Graph 31

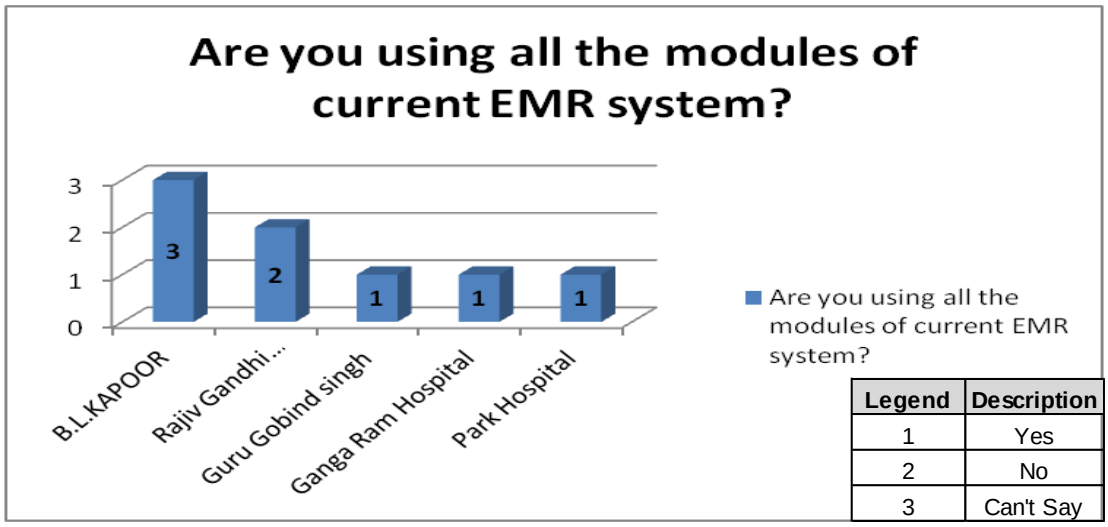


Interpretation

Q. Is the EMR being used by physician in Out Patients Department?

- 40% of stage 5 hospital's physicians do not use EMR system in the OPD.
- 60% of stage 5 hospitals are not sure whether their physicians use EMR system in OPD.

Graph 32



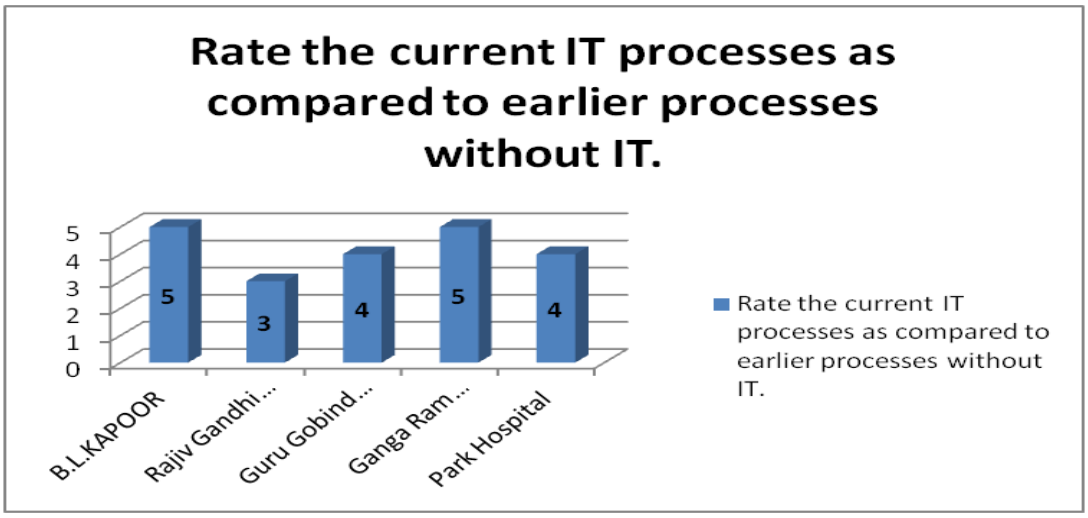
Interpretation

Q. Are you using all the modules of current EMR system?

- 60% of stage 5 hospitals agree of using all the module of the current EMR system.

- 20% of stage 5 hospitals do not use all the modules of the current EMR system.
- 20% of stage 5 hospitals are not sure of using all the modules of the current EMR system.

Graph 33

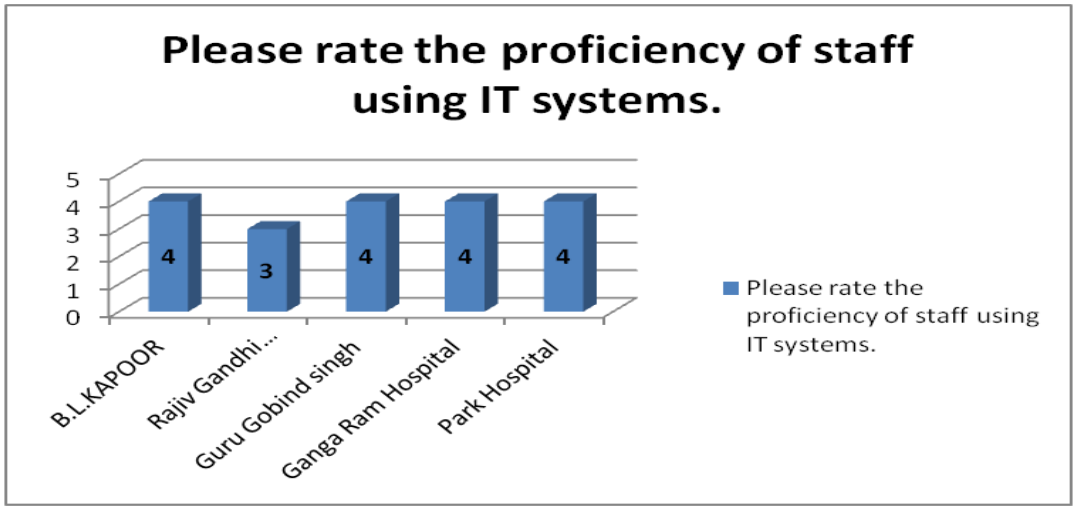


Interpretation

Q. Rating questionnaire

- Hospital has highly rated their new business process against older practices in a non IT environment in terms of efficiency.

Graph 34

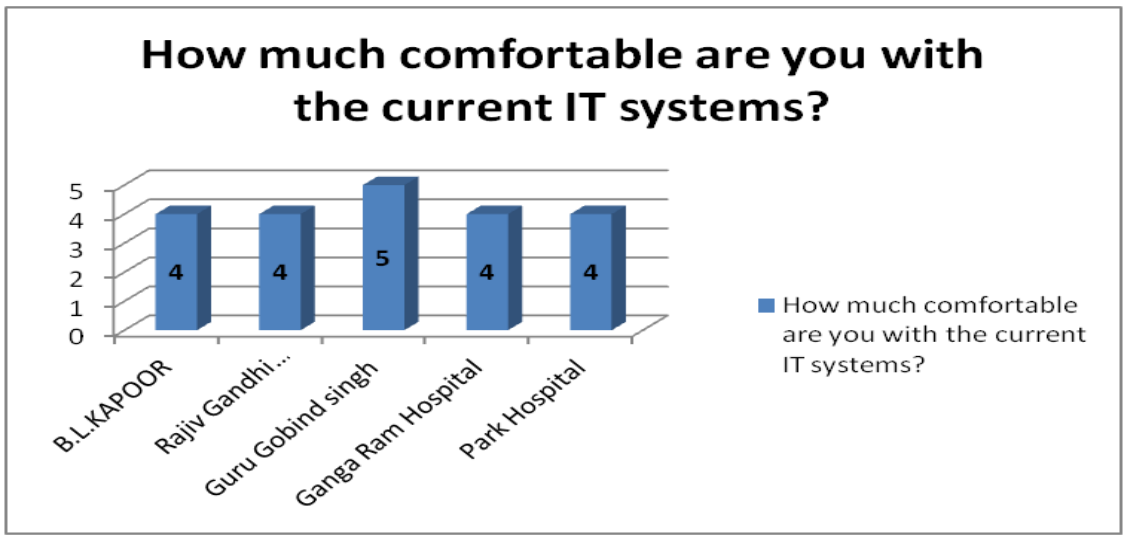


Interpretation

Q. Rating questionnaire

- Hospitals rated high proficiency level of their staff using current IT systems.

Graph 35

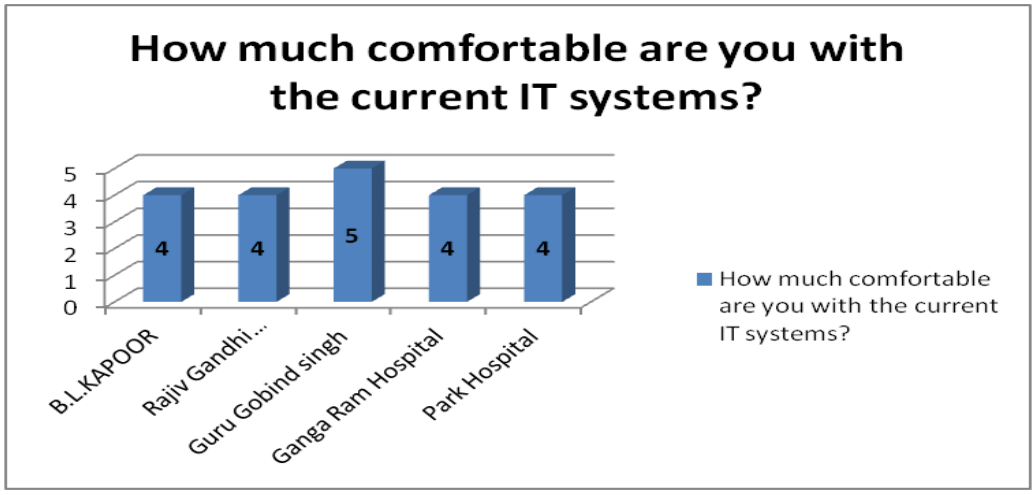


Interpretation

Q. Rating questionnaire

- Hospitals have reported high comfortableness for the usage current IT systems.

Graph 36



Stage 5

- Here been the hospital Bl Kapoor having advanced EMR systems and there Dr are using EMR also so clearly they are comfortable with IT systems.
- All the hospitals in the graph here have the best IT systems in the Delhi NCR in terms of HIS /EMR and cloud computing.

Limitations of the Study

- Not been able to meet many doctors in the hospitals, as this meeting was totally dependent on CEO of that hospitals permission..
- Few organizations been approached, as during this 3 months time duration was there.
- Many hospitals refuse to give access to their staff for the meeting.

Conclusions

- 70 % of hospitals using HIS without clinical modules, so much scope is there EMR adoption and improve in quality of care of patients.
- Many efforts in imparting awareness to hospital management on benefits of IT in healthcare needs to be given.

9. Future recommendations

- Possible ROI studies to be done in hospitals who feel the need of Health IT.
- HIS/EMR modules should be built recognizing High patient load in Indian hospitals.
- HIS/EMR modules should be built recognizing High patient load in Indian hospitals.

This healthcare data can be used for Pharmacy drug discovery purposes and used in area wise drug used data and drug discovery accordingly.

Time in asking for a patient medical file and getting it through Emr can drastically reduce the time of retrieval, otherwise in a paper based set up the ward boy will go the MRD and take out the file and then the file reaches the doctor but Emr makes this process simple with

doctor getting the file by login in his account and getting the patient information from there if the information been entered before.

Decision support systems, particularly for drug order entry, are becoming need in reducing medical errors.

Although health IT has great potential to improve quality so hospitals should make plans to adopt its

Clinical decision support systems are the need of the hour to have medication interaction alerts to doctors and medication dose default settings to prevent errors in practice.

"Basic" EHR systems will have electronic access to clinical information such as patient demographic characteristics, patient encounters, and laboratory and imaging results, with some nurse and clinicians' notes. Thus this will have systematic managing of clinical notes and retrieval on required time.

Clinical-decision support may include information about relevant clinical reminders and safety alerts with respect to drug doses.

EMR promote complete documentation and timely access to patient information, facilitating sound clinical decision making

Developed countries

Developed countries like Canada, new Zealand, Australia have higher EMR adoption because of incentives, standards .India needs to catch up with the standards part here.

Hospitals if use EMR and Data mining then they can check whether they are adhering to treatment guidelines or not for a particular disease segment .Thus they can improve their quality and monitor with the clinical data.

10. Report on Learning's from Kasper Consultancy before been given this Research Report.

a) Various healthcare technologies in hospitals.

Technology like BCMA bar coded medication administration.

HIS Hospital information system

EMR Electronic medical record

CPOE Computerized physician order entry

CDSS Clinical decision support system.

b) Study on hospital hierarchy

Various level nurses, doctors, Ceo and administrator and their decision making powers and roles and responsibilities of each one of them.

c) Study on set up of IT landscape in healthcare scenario.

   Various vendors study, there software features and assessment of their products in market along with their client list.

   Wipro

   AKHIL Systems

   Acuis systems

   Medtrack

   VistA CPRS

d) Insights from Implementation in Max hospitals.

   Regarding problems they faced

Change management.

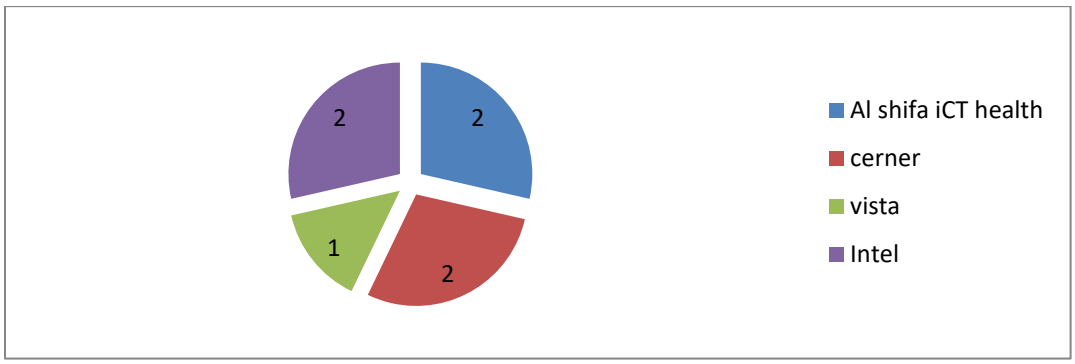
Regarding their approach of implementing Vista system in big bang manner.

e) Business Development strategies in Middle East markets.

Regarding their healthcare GDP and spending on healthcare IT.

Regarding vendors in Middle East.

- Al shifa E.M.R project in Oman.
- Intel projects in Oman
- IcT Health firm's projects in Oman
- Cerner projects in Qatar ,Egypt.
- Vista projects in Egypt.



These numbers in the pie chart shows number of implementation by vendor

- Studied implementations and healthcare industry in these countries.
- Oman
- Qatar (National health information platform program with Cerner IN H.M.C)
- Egypt
- Turkey
- Israel
- S.africa
- Malaysia
- Algeria

- Sri lanka
- Morocco
- Syria
- Iran
- Lebanon
- S.Arabia

f) Various technologies available in Healthcare industry like CPRS, Sri Lankan HMIS demos. And assessment of their features and usability.

g) Study and Demos for Open source software's.
Presentation on open source software features and there reliability in real life hospital environment.

h) Presentation on Work flows in various departments like Lab and pharmacy. Various work processes in both dept's And role of users in this dept's and there linkages with other dept's like billing. Latest technologies in these Depts.

i) Study of As is and To be processes in Implementation. AS IS Implementation In this various process in hospitals before a implementation is done is discussed in detail. Regarding various users and there day to day activities.

To be implementation is the new system that a hospital implements and adopts newer processes. How the hospital user new roles and responsibilities would be this explores that in detail.

j) Study of change management in hospitals. Various human aspects of change management in organizations and how they dealt with it and their case study discussions on that aspect.

k) Study of Vendor Location in healthcare industry and there software's demos. Various vendors in various territories were located and there live demos on the office environment. And there assessment based on their usability.

l) Study of Need Assessment of hospitals in terms of technology usage. Locating the hospitals need assessment in terms of what they can achieve with quality and operation efficiency.

m) Study of perception of EMR in Delhi NCR hospitals people mindsets. In depth meetings with doctors, IT people and CEO and there view on why EMR is not widely accepted in Delhi NCR hospitals and reasons for this.

n) Study of various strategies on implementation approaches like Bottom up approach or Big bang approach in hospital EMR implementation. Various discussion of positives and negatives of implementation of all modules in all departments in one go as in BIG BANG implementation or other Step by step implementation in various departments one by one.

o) Presentation on stages of EMR implementation best practice around the globe. Best practices adopted by various EMR implementation hospitals and their strategies and where they can fit in Indian context.

p) Assessment on pharmacy to be in House or Outsourced in hospital set up. An Assessment on which is better? In house pharmacy like hospitals having pharmacy in their own control

OR

Hospitals been outsourcing there pharmacy to outside vendors.

q) Process maps on hospital department like Ortho process and Rfid adoption. Process mapping Process Map or a process flow chart (the terms process map and process flow chart are used interchangeably) to describe a process. a process is a structured set of activities that transform inputs into outputs.

List of hospitals included in study

Columbia Asia Hospital

GB Pant Hospital

Jaipur Golden Hospital

Action Balaji Hospital

Kalyani hospital

MGS hospital

Deen Dayal Upadhya Hospital

Maharaja Agarseen Hospital

Jeevan Mala Hospital

Jivodhaya Hospital

Kukreja hospital

Ridge Heart Institute

National Heart Institute

B.L Kapoor Hospital

Delhi Heart & Lung Institute

Center for sight

Rajiv Gandhi Cancer Institute

Kalra Hospital

Guru Gobind Singh Hospital

Orthonova

Ganga Ram Hospital

Artemis Hospital

Paras Hospital

Park Hospital

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12. ANNEXURES

4th Semester Dissertation

"Level of prevalence of Healthcare IT in hospitals across Delhi and NCR"

Survey Questionnaire

Introductory Questions

1. Tell us briefly about various department/services provided by the hospital.
2. What are some of the day-to-day challenges in the hospital operations?

IT System Survey Questions

3. Briefly tell us about your IT systems?
4. What have been the 3 key benefits of the IT systems that you installed?
5. What have been the 3 key challenges of the IT systems that you installed?
    a. Do you think the current IT systems have helped to improve operational efficiency in the hospitals?
    b. Are you satisfied with the way the health records are managed currently?
    c. What are manual processes still being followed in your hospital?
    d. Did the hospital undertake an evaluation of system before procurement?
    e. What were the broad evaluation criteria for the system?
6. Has the IT system helped your business goals?
7. How you manage your servers? Or are you looking for cloud computing to go away with it?

(Basically for 5th Stage)

8. What level of adoption for the IT systems at your hospital you want to achieve ?
9. Features of HIS?

System Checklist

Sr. No.	Stages	IT Capabilities	Please Tick ✓	SW/HW Name	Vendor
1.	Stage 1	Patient Registration			
		Patient Appointment			
		Doctor/Staff Scheduling			
2.	Stage 2	Lab.			
		Radiology			
		Pharmacy			
		Billing			
		PACS (basic)			
3.	Stage 3	HIS(without clinical module)			
		Inventory Management			
		Bed Allocation			
4.	Stage 4	HIS (with clinical module)			
		Medication Orders			
		Clinical Decision Support (Drug-Drug Interaction, Allergy Information)			
5.	Stage 5	CPOE (Computerized physician order entry)			
		BCMA			

		(Bar-coded medication admn.)				
		PACS (full)				
		EMR				
1.	Technology Usage	RFID				
2.		M-health				
3.		Finger printing				
4.		Tablets				
5.		Dicta Phone				
6.		Wi-fi				
7.		Wi-max				
8.		Medical Transcription				
9.		Voice to text				
10.		Online Applications				
11.		Cloud Technology				
Strongly Agree		**Agree**	**Can't Say**	**Disagree**	**Strongly Disagree**	
5		**4**	**3**	**2**	**1**	

Stage-1

Q1.	Is the current manual process meeting your needs?	Yes	No	Can't Say
Q.2	Is the present T.A.T is satisfactory in labs for your hospitals ?	Yes	No	Can't Say
Q3	Do you feel the need of having IT in labs and radiology?	Yes	No	Can't Say
Q.4	Are you satisfied with your inventory management system?	Yes	No	Can't Say
Q.5	Would you like to have pharmacy drugs management by system?	Yes	No	Can't Say

Q.6	Are you satisfied with the manual process of ordering procedures and lab reports ?	Yes	No	Can't Say		
Please Rate on a scale of 1 to 5						
Q7	How much comfortable are you with the current IT systems?	5	4	3	2	1
Q8	Do you indent to buy HIS incoming future to meet your needs?	5	4	3	2	1

Any Comment

Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree
5	**4**	**3**	**2**	**1**

Stage 2

Q.1	IS the current manual process meeting your needs?	Yes	No	Can't Say		
Q.2	Is TAT in lab is satisfactory for your hospital?	Yes	No	Can't Say		
Q.3	Do you feel the need for integrated HIS system?	Yes	No	Can't Say		
	IS TAT in pharmacy is satisfactory for your hospital?	Yes	No	Can't Say		
Q.4	Do you feel trouble managing you inventory?	Yes	No	Can't Say		
Q.5	Has IT improved patient care?	Yes	No	Can't Say		
Q.6.	Has your inventory management in pharmacy improved?	Yes	No	Can't Say		
Please Rate on a scale of 1 to 5						
Q7.	Rate the current IT processes as compared to earlier processes without IT?	5	4	3	2	1
Q8	How comfortable are you with the current IT systems?	5	4	3	2	1
Q9	How would you rate the system performance i(load handling)?	5	4	3	2	1

Any Comment

Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree
5	4	3	2	1

Stage-3

Q1.	Do you think the HIS system has helped in improving operational efficiency?	5	4	3	2	1
Q2.	Do you think HIS system has helped in improving quality of care?	5	4	3	2	1
Q3.	Do you think your HIS should have feature of clinical and medication orders?	5	4	3	2	1
Q4.	Would you like to incorporate basic CDSS (such as allergy info, drug-drug interaction)	5	4	3	2	1
Q5.	Do you think connecting the whole hospital or linking them together is beneficial?	Yes	No	Can't Say		
Q7.	Do you share all the information across different systems in hospital?	Yes	No	Can't Say		
Q8.	Will IT help in inventory management of stock of items in Hospital?	Yes	No	Can't Say		
Q9.	Will IT help in Inpatient Patient Billing Process in Hospital?	Yes	No	Can't Say		
Q10.	Is real time data available for processing information (such as MIS reports)	Yes	No	Can't Say		
Q.11	Is all the modules of HIS been used by staff?	YES	NO	Can't say		
Q.12	Do you feel the need for providing patient information on the system ?	YES	NO	Can't say		
Q.13	Does your h.i.s. has tpa/insurance module ?	YES	NO	Can't say		
Q.14	Are you satisfied with G.U.I of your h.i.s.?	YES	NO	Can't say		
Please Rate on a scale of 1 to 5						
Q11.	Rate the current IT processes as compared to earlier processes without IT?	5	4	3	2	1
Q12.	Please rate the proficiency of staff using IT systems?	5	4	3	2	1
Q13.	How much comfortable are you with the current IT systems?	5	4	3	2	1
Q14.	How would you rate the performance of system in terms of usage and load handling?	5	4	3	2	1

Any Comment

Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree
5	4	3	2	1

Stage-4

Q1.	Do you think the IT system has helped in improving operational efficiency?	5	4	3	2	1
Q2.	Do you think IT system has helped in improving quality of care?	5	4	3	2	1
Q3.	Do you think connecting the whole hospital or linking them together is beneficial?	Yes	No	Can't Say		
Q4	Do you share all the information across different systems in hospital?	Yes	No	Can't Say		
Q5.	Will IT help in inventory management of stock of items in Hospital?	Yes	No	Can't Say		
Q6.	Will IT help in Inpatient Patient Billing Process in Hospital?	Yes	No	Can't Say		
Q7.	Are you using all the modules of current HIS system?	Yes	No	Can't Say		
Q8.	Are you maintaining the hard copy of patient record?	Yes	No	Can't Say		
Q9.	Is real time or online data available for processing information (such as MIS reports)	Yes	No	Can't Say		
Q10.	Do you use coding system for diseases and use them across insurance sector to help TPA in managing claims.	Yes	No	Can't Say		
Q11.	Should IT be mapped for hospital processes and vice versa	Yes	No	Can't Say		
Please Rate on a scale of 1 to 5						
Q12.	Rate the current IT processes as compared to earlier processes without IT.	5	4	3	2	1
Q13.	Please rate the proficiency of staff using IT systems.	5	4	3	2	1
Q14.	How much comfortable are you with the current IT systems?	5	4	3	2	1
Q15.	Rate the usability of IT systems in maintaining patient records.	5	4	3	2	1
Q16.	How would you rate the performance of system in terms of usage and load handling?	5	4	3	2	1
Q17.	Rate your modified workflows against old practices without IT systems.	5	4	3	2	1

Any Comment

Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree
5	**4**	**3**	**2**	**1**

Stage-5

Q1.	Do you think the IT system has helped in improving operational efficiency?	5	4	3	2	1
Q2.	Do you think IT system has helped in improving quality of care?	5	4	3	2	1
Q3.	Do you think connecting the whole hospital or linking them together is beneficial?	Yes	No	Can't Say		
Q4.	Do you share all the information across different systems in hospital?	Yes	No	Can't Say		
Q5	Are you entering real time patient data in the EMR?	Yes	No	Can't Say		
Q6.	Is the EMR being used by physician in Out Patients Department?	Yes	No	Can't Say		
Q7.	Are you using all the modules of current EMR system?	Yes	No	Can't Say		
Q8.	Are you also maintaining the hard copy of patient record?	Yes	No	Can't Say		
Q9.	Is real time or online data available for processing information (such as MIS reports)	Yes	No	Can't Say		
Q10.	Do you use coding system for diseases and use them across insurance sector to help TPA in managing claims.	Yes	No	Can't Say		
Q11.	Should IT be mapped for hospital processes and vice versa	Yes	No	Can't Say		
Please Rate on a scale of 1 to 5						
Q12.	Rate the current IT processes as compared to earlier processes without IT.	5	4	3	2	1
Q12	Please rate the proficiency of staff using IT systems.	5	4	3	2	1
Q13.	How much comfortable are you with the current IT systems?	5	4	3	2	1
Q14.	Rate the usability of IT systems in maintaining patient records.	5	4	3	2	1
Q15.	How would you rate the performance of system in terms of usage and load handling?	5	4	3	2	1
Q16.	Rate your modified workflows against old practices without IT systems.	5	4	3	2	1

Which community of user is using EMR the most:-

Please enlist Current Challenges faced due to EMR