DISSERTATION

AT

ALLSCRIPTS, PUNE

Study of Employee Perception regarding implementation of XYZ Company Electronic Medical Record/ Electronic Health Record Software

By

Dr. Dherya Sahni

PG/14/73

Under The Guidance

Mr. Nishikant Bele

Post Graduate Diploma in Hospital and Health Management

2014-2016

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

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TO WHOMSOEVER MAY CONCERN

(Completion of Dissertation from respective organization)

The certificate is awarded to

Dr. Dherya Sahni

In recognition of having successfully completed her

Internship in the department of

OS Global Services

and has successfully completed her Project on

Study of Employee Perception regarding implementation of XYZ Company Electronic Medical Record/ Electronic Health Record Software

Date 10th May 2016

Organization Allscripts, Pune

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning

We wish her all the best for future endeavors

Certifying Authority:

Signature: ATKINS

Name: Mr. Atkins Cheeran

Designation: Associate Manager, Managed Services

Contact: Atkins.Cheeran@allscripts.com

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. DheryaSahni**student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at **Allscripts, Pune** from **Feburary 9 2016** to **May 2016**

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 her all success in all her future endeavors

Dr. A.K. Agarwal

Dean, Academics and Student Affairs
IIHMR, New Delhi

Mr. NishikantBele

IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Study of Employee Perception regarding implementation of XYZ Electronic Medical Record/ Electronic Health Record Software"**at Allscripts, Pune is hereby approved as a certified study in management carried out and presented in a manner satisfactorily 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.

Name	**Signature**
Mr. Surjeet Thakur	
Mr. SurendraTyagi	

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Dherya Sahnia** graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. She is submitting this dissertation titled titled **"Study of Employee Perception regarding implementation of XYZ Electronic Medical Record/ Electronic Health Record Software"** at "**Allscripts, Pune**" in partial fulfillment 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.

Mr. Nishikant Bele

Associate Professor

IIHMR, Delhi

Mr.Atkins Cheeran

AssociateManager
OS Global Services

Allscripts,Pune

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled**"Study of Employee Perception regarding implementation of XYZ Electronic Medical Record/ Electronic Health Record Software"**and submitted by **Dr.Dherya Sahni** Enrollment No. **PG/14/73**under the supervision of **Mr. Nishikant Bele** for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from February 9 2016 to May 10 2016embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

DHERYA
Signature

FEEDBACK FORM

Name of the Student: DHERYA SAHNI

Dissertation Organization: ALLSCRIPTS

Area of Dissertation: Study of Employee Perception regarding implementation of X42 Company Electronic Medical Record / Electronic Health Record Software

Attendance: 99%

Objectives achieved: Dherya has met all the set objectives

Deliverables: Shadowed the CM team & Order sets team

Strengths:
- good analytical skills.
- quick learner & hard working
- focussed & good team player

Suggestions for Improvement: She needs to be a little more confident & articulate.

Signature of the Officer-in-Charge/ Organization Mentor (Dissertation)

Date: 08-May-2016

Place: PUNE

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DHERYA.

Dherya Sahni

IIHMR, New Delhi

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

S.No	Abbreviation	Full-Form
1	ARRA	American Recovery and Reimbursement Act
2	CAH	Critical Access Hospital
3	CDSS	Clinical Decision Support Systems
4	CFO	Chief Functional Officer
5	CIO	Chief Informational Officer
6	CMS	Centre of Medicare and Medicaid services
7	COO	Chief Operational Officer
8	CPOE	Computerized Physician Order Entry
9	HER	Electronic Health Record
10	EH	Eligible Hospital
11	EMR	Electronic Medical Record
12	EP	Eligible Professional
13	FQHC	Federally qualified health-center
14	HIPPA	Health Insurance Portability & Accountability Act
15	HITECH	Health Information Technology Economic and Clinical Act
16	ICFs/MR	Intermediate care facilities for the mentally retarded
17	MU	Meaningful Use
18	PHI	Protected Health Information

LIST OF TABLES

1.2 LEARNINGS AT ALLSCRIPTS

- Mandatory trainings on Organizational ethics and culture
- E-learning's on US Healthcare Industry
- Intensive training of the Inpatient module of a leading electronic health record in the USA
- Overview of all the modules of the electronic health record
- Shadowed under Team Lead on Clinical Performance Module.
- Analyzed and documented the nature of requirements of Client who are about to Go-live with the electronic health record
- Trained on the different workflows associated within the Inpatient module
- Hands-on training on the text side of the electronic health record system

2.1 ABSTRACT

Our world has been radically transformed by digital technology – smart phones, tablets, and web-enabled devices have transformed our daily lives and the way we communicate. Medicine is an information-rich enterprise. A greater and more seamless flow of information within a digital health care infrastructure, created by electronic health records (EHRs), encompasses and leverages digital progress and can transform the way care is delivered and compensated. With EHRs, information is available whenever and wherever it is needed.

From leveraging large data to introducing social-networking sites and gaming applications, the industry is now focusing on how technology can help us get — and stay — healthy."

The U.S stays a leader in medical innovation even today and incorporation of technology is still the ruling factor.

Health care delivery is being reengineered to focus on value. It is very evident on how the technology is giving the healthcare industry the much needed upgrade like: data-c**runching, enhanced patient-physician communications, remote area access, mobile services etc. Gradually the healthcare delivery system will see a transformation from a volume-based output system to a one which is streamline to the value of the services provided.**

The value in quality care will be defined by decrease in high-costs and even more in terms long-range outcomes improving the general well-being and quality of life. [1]

Electronic Health Record (EHR) and Electronic Medical Record (EMR), gaining importance these days help in improving the quality of health care. EHR and EMR are used interchangeably from many years but there is a basic difference among the two.

Objective is to Study the employee perception regarding implementation of Allscripts EMR/HER system Software. Exploratory and Descriptive study was done. Data was collected using convenient sampling method & sample size of 40 was used.

Primary data is collected from Quantitative survey analysis of major key stakeholders involved in EMR/EHR system implementation and support and Secondary data from Training companion of Allscripts and User-web portal of Allscripts.

2.2 INTRODUCTION

Our world has been radically transformed by digital technology – smart phones, tablets, and web-enabled devices have transformed our daily lives and the way we communicate. Medicine is an information-rich enterprise. A greater and more seamless flow of information within a digital health care infrastructure, created by electronic health records (EHRs), encompasses and leverages digital progress and can transform the way care is delivered and compensated. With EHRs, information is available whenever and wherever it is needed. [1]

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2.2.1 An **electronic medical record**, An EMR contains the standard medical and clinical data gathered in one provider's office. Electronic health records (EHRs) go beyond the data collected in the provider's office and include a more comprehensive patient history. The electronic replacement for paper charts, is the record of patient health information generated by encounters at one particular physician practice.

2.2.2 An **electronic health record** is a systematized collection of patient and population electronically-stored health information in a digital format. These records can be shared across different health care settings. Records are shared through network-connected, enterprise-wide information systems or other information networks and exchanges. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal statistics like age and weight, and billing information.

Health records are needed for:

- **Continuity of patient care**
- **Coordinated patient care**
- **Evidence in support of insurance and reimbursement claims**
- **Offer legal protection to those who provide care to the patient**

- **Ensure documentation of compliance with institutional, professional or Governmental regulation**
- **Provide statistical information that is helpful to researchers**
- **Provide the basis of quality assurance**
- **Provide data for preventive medicine programs, risk management programs**

EHR and EMR help us achieving not only above mentioned uses but are also a powerful tool in achieving better quality health care services. Clinical Decision Support System (CDSS) helps in better decision making about diagnosis and treatment plan for a patient. Software like Computerised Physician Order Entry (CPOE) helps in removing error caused due to illegitimate handwriting and not to mention that information is available anywhere anytime in fractions of second.

2.3 Meaningful Use

Meaningful use, in a health information technology context, defines the use of electronic health records and related technology within a healthcare organization .It sets specific objectives that eligible professionals and hospitals must achieve to qualify for Centers for Medicare & Medicaid Services Incentive Programs.

Meaningful use is using certified electronic health record technology to:

- Improve quality, safety, efficiency, and reduce health disparities
- Engage patients and family
- Improve care coordination, and population and public health
  Maintain privacy and security of patient health information

2.3.1 Meaningful Use Formulation

- The requirements of the Meaningful Use program are defined by two Health and Human Services (HHS) agencies, with input from federal advisory committees.
- The Center for Medicare and Medicaid Services (CMS) is responsible for defining which providers and hospitals are eligible, and what an eligible provider or hospital must do to participate. One of the primary requirements of the program is that eligible providers and eligible hospitals (EPs and EHs) use certified software.
- The criteria for meeting Meaningful Use are divided into the following five initiatives:

- Improve quality, safety, efficiency, and reduce health disparities
- Engage patients and families
- Improve care coordination
- Improve population and public health
- Ensure adequate privacy and security protections for personal health information

2.3.2. Meaningful Use Stages

Meaningful Use requirements are divided into stages of increasing complexity. As per CMS, the planned progression through the stages is as follows:

First year of Meaningful Use	**Payment Year (EP/Hospital)**						
	2011	2012	2013	2014	2015	2016	2017
2011	Stage 1	Stage 1	Stage 1	Stage 2	Stage 2	Stage 2	Stage 3
2012		Stage 1	Stage 1	Stage 2	Stage 2	Stage 2	Stage 3
2013			Stage 1	Stage 1	Stage 2	Stage 2	Stage 3
2014				Stage 1	Stage 1	Stage 2	Stage 2
2015					Stage 1	Stage 1	Stage 2
2016						Stage 1	Stage 1

Figure 1

Meaningful Use Stage 1 was defined in 2010 and further refined in 2012 with the issuance of another Final Rule defining Stage 2. Future rulings defining Stage 3 and beyond is anticipated.

2.3.3 Incentive Eligibility

Both Medicare and Medicaid provide incentive payments based on Meaningful Use of an EHR. These incentive payments apply to both Eligible Professionals and Hospitals.

Eligible Professionals

Eligible Professionals are defined by CMS as

a) Medicare Eligible Professional
A physician as defined in section 1861(r) of the Social Security Act, which includes all of the following types of professionals:

- A doctor of medicine or osteopathy

- A doctor of dental surgery or medicine
- A doctor of podiatric medicine
- A doctor of optometry
- A chiropractor

b) Medicaid Eligible Professional
Five types of Medicaid professionals are identified: physicians, dentists, certified nurse-midwives, nurse practitioners, and physician assistants. Medicaid Eligible Professionals must meet the criteria for Medicaid incentive payment eligibility, such as the patient volume thresholds or practicing predominantly in a Federally Qualified Health Center.

Eligible Hospitals

Eligible hospitals are defined by CMS as

a) Medicare Eligible Hospital
Hospitals located in one of the fifty states or in the District of Columbia are eligible. Psychiatric, rehabilitation, long term care, children's and cancer hospitals are excluded. Hospitals will be counted based on the CMS certification number of the main provider.

b) Medicaid eligible hospital
Acute care and Children's Hospitals are listed as the only two types of institutional providers potentially eligible for Medicaid incentive payments.

c) Critical access hospital (CAH)
Critical access hospitals are rural community hospitals that receive cost-based reimbursement. To be designated a CAH, a rural hospital must meet defined criteria that are outlined in the Conditions of Participation and subsequent legislative refinements.

2.4 CMS

The Centers for Medicare & Medicaid Services (CMS) is an agency within the US Department of Health & Human Services responsible for administration of several key federal health care programs. The CMS administers the Medicare program and works in partnership with state governments to administer Medicaid, the State Children's Health Insurance Program and health insurance portability standards.

Among other things, the CMS also oversees the administrative simplification standards from the Health Insurance Portability and Accountability Act of 1996 (HIPAA), quality standards in long-term care facilities, and clinical laboratory quality standards under the Clinical Laboratory Improvement Amendments. The CMS employs about 4,100 people and has 10 regional offices throughout the US. [3]

2.4.1 Medicare is a health insurance program for:

- people age 65 or older,
- people under age 65 with certain disabilities, and
- people of all ages with End-Stage Renal Disease (permanent kidney failure requiring dialysis or a kidney transplant).

Medicare has:

Part A Hospital Insurance - Most people don't pay a premium for Part A because they or a spouse already paid for it through their payroll taxes while working. Medicare Part A (Hospital Insurance) helps cover inpatient care in hospitals, including critical access hospitals, and skilled nursing facilities (not custodial or long-term care). It also helps cover hospice care and some home health care. Beneficiaries must meet certain conditions to get these benefits.

Part B Medical Insurance - Most people pay a monthly premium for Part B. Medicare Part B (Medical Insurance) helps cover doctors' services and outpatient care. It also covers some other medical services that Part A doesn't cover, such as some of the services of physical and occupational therapists, and some home health care. Part B helps pay for these covered services and supplies when they are medically necessary.

Prescription Drug Coverage - Most people will pay a monthly premium for this coverage. Starting January 1, 2006, new Medicare prescription drug coverage will be available to everyone with Medicare. Everyone with Medicare can get this coverage that may help lower prescription drug costs and help protect against higher costs in the future. Medicare Prescription Drug Coverage is insurance. Private companies provide the coverage. Beneficiaries choose the drug plan and pay a monthly premium. Like other insurance, if a beneficiary decides not to enrol in a drug plan when they are first eligible, they may pay a penalty if they choose to join later.

2.4.2 Medicaid:

Medicaid covers low-income and financially needy people, including those over 65 who are also on Medicare. Medicaid is administered by the 50 states; rules differ in each state. .Medicaid provides comprehensive inpatient and outpatient health care coverage, including many services and costs Medicare does not cover, most notably, prescription drugs, diagnostic and preventive care, and eyeglasses. The amount of coverage, however, varies from state to state.

S**ervices provided with Medicaid:**

- Inpatient hospital services
- Outpatient hospital services
- Prenatal care
- Vaccines for children

- Physician services
- Nursing facility services for persons aged 21 or older
- Family planning services and supplies
- Rural health clinic services
- Home health care for persons eligible for skilled-nursing services
- Laboratory and x-ray services
- Pediatric and family nurse practitioner services
- Nurse-midwife services
- Federally qualified health-center (FQHC) services and ambulatory service
- Early and periodic screening, diagnostic, and treatment (EPSDT) services for children under age 21
- Home and community-based care to certain persons with chronic impairments

2.5 HIPPA

HIPAA is the federal Health Insurance Portability and Accountability Act of 1996. The primary goal of the law is to make it easier for people to keep health insurance, protect the confidentiality and security of healthcare information and help the healthcare industry control administrative costs.
HIPAA is divided into different titles or sections that address a unique aspect of health insurance reform. Two main sections are Title I dealing with Portability and Title II that focuses on Administrative Simplification. [4]

Portability: This section allows individuals to carry their health insurance from one job to another so that they do not have a lapse in coverage. It also restricts health plans from requiring pre-existing conditions on individuals who switch from one health plan to another.

Administrative Simplification: This section is the establishment of a set of standards for receiving, transmitting and maintaining healthcare information and ensuring the privacy and security of individual identifiable information.
The **HIPAA** electronic data requirements are meant to encourage the health care industry to move the handing and transmission of patient information from manual to electronic systems in order to improve security, lower costs, and lower the error rate. However, the main focus on this page is the Privacy provisions of HIPAA.

Privacy: HIPAA provides for the protection of individually identifiable health information that is transmitted or maintained in any form or medium. The privacy rules affect the day-to-day business operations of all organizations that provide medical care and maintain personal health information.

HIPAA requires the following entities to comply:

Health Care Providers: Any provider of medical or other health Services that bills or is paid for healthcare in the normal course of business. Health care includes preventive, diagnostic, therapeutic, rehabilitative, maintenance, or palliative care, and counselling, services,

assessment, or procedure with respect to the physical or mental condition, or functional status of an individual.

Health Care Clearinghouse: Businesses that process or facilitate the processing of health information received from other businesses. It includes groups such as physician and hospital billing services.

Health Plans: Individuals or group plans that provide or pay the cost of medical care and includes both Medicare and Medicaid programs.

What Health Information is protected?

HIPAA protects an individual's health information and his/her demographic information. This is called "protected health information" or "PHI". Information meets the definition of PHI if, even without the patient's name, if you look at certain information and you can tell who the person is then it is PHI. The PHI can relate to past, present or future physical or mental health of the individual. PHI describes a disease, diagnosis, procedure, prognosis, or condition of the individual and can exist in any medium – files, voice mail, email, fax, or verbal communications.

Patient's Rights

HIPAA stipulates the following patient's right under its privacy rule:

- Patients have a right to receive a notice of the privacy practices of any health care provider health clearing house, or health plan.
- Patients have a right to see their PHI and get a copy.
- Patients have a right to request that changes be made to correct errors in their records or to add information that ha been omitted.
- Patients have a right to see a list of some of the disclosures that have been made of their PHI.
- Patients have a right to request that you give special treatment to their PHI.
- Patients have a right to request confidential communications.
- Patients have a right to complain.

A health provider can disclose an individual's PHI without the patient's authorization if the disclosure deals with treatment, payment, operations, or if the information is mandated by law. Otherwise, for most other uses, the patient will need to authorize the provider to make the disclosure.

A patient has the right to submit a complaint if he believes that the health provider has:

- Improperly used or disclosed their PHI
- Concerns about their HIPAA Privacy policies
- Concerns about the provider's compliance of its privacy policies.

The patient may file the complaint with either of the following:

- The provider's Chief Privacy Officer
- The US Department of Health and Human Services, Office of Civil Rights, www.hhs.gov/ocr/hipaa

2.6 Health Information Technology for Economic and Clinical Health Act (HITECH Act)

The Health Information Technology for Economic and Clinical Health Act (HITECH Act) legislation was created in 2009 to stimulate the adoption of electronic health records (EHR) and supporting technology in the United States as part of the American Recovery and Reinvestment Act of 2009 (ARRA).

Subtitle D of the HITECH Act addresses the privacy and security concerns associated with the electronic transmission of health information, partly through several provisions that strengthen the civil and criminal enforcement of the HIPAA rules.

With a motive of better quality of care, patient safety and lowering cost of care by creating national level Health information exchange with the use of Electronic health records there was a legislation called HITECH within AARA that was signed by the president of the US which developed an incentive program for Eligible Providers and Hospital serving Medicare and Medicaid patients. HITECH Act requires providers and hospital to adopt EHR in order to be eligible for the incentives. Eligible provider and hospital needs to invest in a government certified EHR at the same time the practices need to display meaningful use of the technology. Meaningful Use objectives are detailed in two set i.e. core sets and menu sets. Core set have 15 compulsory objectives that all the practices must to comply whereas Menu set have 10 objectives out which the practice need to comply with at least five objective. So a practice needs to comply with 20 objectives to demonstrate meaningful use. Failing to comply with even one of the requirements will make the practice ineligible for the incentive program. HITECH has two separate incentive program Medicare and Medicaid. An individual provider who see more than 30% of Medicare or Medicaid patient can earn up to $44,000 as incentive under Medicare program and $64,000 under Medicaid program. Even for group practices the incentives will be rolled out per provider basis.
Any delay or failing to implement EHR and non-compliance of Meaningful use will not only cost the incentives, government will also be penalizing the practices and cutting down on the service reimbursement rate.

2.7 Implementation Practices

Implementation of EHR/EMR involves number of tasks which hospital, clinics, physician practices and other care setting must take care of. It involves development of strategies, planning, staffing, continuous bi directional flow communication among staff, training and continuous technical support.

2.7.1Big Bang Approach: All the functionality of the new system is introduced to entire organization at once. We can see big bang approach in a clinic or small health care setting depending on size and need of the organization. This reduces the efficiency significantly for 2-4 weeks which may lead to reduction in patient load by 50 percent during that phase. It can be difficult for smaller and rural practices. The advantage to this approach is multiple workflows and systems do not need to be maintained simultaneously during the transition phase

2.7.2Phased Approach: Here functionality is introduced incrementally in phases. It can be achieved in two ways; first provider introduces functionality in test departments and then move to other departments or units of the institution. Second; provider introduces several several functionalities across the entire organization followed by the addition of new functionalities once the first few have been mastered.

In general, due to the complexity of inpatient workflows, hospitals generally find use of phased go-live approach often by department/unit or software module as it leads to less disruptions. [7]

2.7.3 Agile Methodology: Agile implementation method is also a type of incremental method. Here implementation occurs in incremental and rapid cycles. This results in small incremental releases with each release building on previous functionality. Each release is thoroughly tested to ensure quality is maintained. [8]

Characteristics that is common to all agile methods:

1. Active user involvement is imperative
2. The team must be empowered to make decisions
3. Requirements evolve but the timescale is fixed.
4. Capture requirements at a high level; lightweight & visual
5. Develop small, incremental releases and iterate
6. Focus on frequent delivery of products
7. *Complete* each feature before moving on to the next
8. Apply the 80/20 rule
9. Testing is integrated throughout the project lifecycle – test early and often
10. A collaborative & cooperative approach between all stakeholders is essential

2.7.5 SCRUM Method: it is also an agile development method. The focus is more on how to manage tasks within a team. Scrum is the most popular and widely adopted agile method as it is relatively simple to implement and addresses many of the management issues.

Scrum divides complex work into simple pieces, doing so it is easier to map out what needs to be done. With clear instructions and roadmap team can start working immediately.

Product backlog is a list of tasks that needs be done over the lifetime of the project. The product backlog is divided and defined into items that can be delivered independently of each other.

Sprint backlog includes all items that need to be completed by the end of the sprint and reflects the priority order of the product backlog. Once the sprint backlog is finalized, changes should not be made except in rare circumstances. This restriction helps the team maintain focus by limiting interruptions and changes to scope mid-sprint. It is derived from product backlog.

Scrum Team is managed or lead by **Scrum Master.** Steps involved in Scrum are:

Sprint planning is when the team decides what needs to be done in the coming sprint and how much it can accomplish. It includes following:

1. Explain requirements to the team
2. Identify and list the task to be done.
3. Assign the task to team members.

Daily scrum involves daily stand up meetings. Daily meetings focus on the tasks done.

1. What was done yesterday?
2. What is planned for today?
3. What needs to be tomorrow?
4. Are there issues or concerns?

Sprint review that takes place at the end of the sprint. It is designed to gather actionable feedback on what the team has completed and gives a chance to inspect the overall plan.

The sprint retrospective helps the team inspects and adapts its process by asking:

1. What went well during the sprint?
2. What could have been better?
3. Any corrections needed?

2.8 Implementation Process

2.8.1 Pre-Implementation

Contract:

- The contract should spell out what is and is not included in the implementation costs: what services will be received, how many hours, who the resources will be, what sort of materials will be provided (e.g., project plan, implementation guides, specifications), etc.

- The contract should spell out what are acceptable and non-acceptable costs and establish a per diem rate for implementation staff. [9]

Planning: it is the most important and time consuming phase of EHR/EMR implementation. Develop Master Plan:

- Understand Vision & Objectives
- Formation of Governing Body and Defining Roles & Responsibility
- Project Plan for all

Assess existing systems

- What information exists on current systems? Is it valuable to the new EHR?
- What internet access do you have?
- Can existing hardware be re-used?
- Compare to necessary specifications for EHR

Needs with EHR

- What kind of speed is necessary? T1 line or DSL?
- Can wireless make us more or less efficient? If more efficient, how many ports?
- How do we transfer data from existing systems to EHR? Can vendor create a program to transfer? If so, how much does it cost?

"As is" Process study

- Multiple terminology
- Understanding Departmental Workflow
- Understanding SOPs and Pain Areas
- "As is" Process Charts

Infrastructure Assessment

- Infrastructure Site Assessment
- Infrastructure Recommendations for new system

Functional Requirement Gathering

- Requirement Specification Document
- Requirement Prioritization

“To be” Process Definition

- Based on User Requirements, “As is” Process & Product functionalities
- “To be” Process Chart Documentation

Gap Analysis

- Identify gaps between Requirements and product functionalities
- Product Gap document
- Gap Mitigation Plan

Address training needs early

- Identify super users early on and allow them to become familiar with the product as soon as possible
- Train users on redefined workflows rather than on product features and functions
- Vendor should know the training strategy with the client. Get familiar with concerns and scheduling needs.

Develop data migration plan

Identify each piece of medical information in the paper chart:

- Importance
- Source
- Format
- Priority
- Minimum skill set needed for quality entry

Identify available resources:

- People
- Time
- Skills
- Hardware

Implement the migration plan well before go-live.

Challenges of Migration

- Migration is important in the beginning of the process when system proficiency is limited
- Staff may be working with limited time and system access
- Lots of data - many options for entry
- Quality of the migrated data affects how it is used

2.8.2 Implementation

Key training aspects include:

- Allowing users to concentrate on how the EHR is used in the context of their job.
- Identifying and training of super users.
- Coordinating scheduled training hours so that team members are trained on the EHR with their respective colleagues, i.e. front office staff is trained with other front office staff members.
- Support continuity with trainers – same trainer should be provided for each aspect. .
- Hands on training are more important than class room sessions.
- Schedule at least one, if not more, mock go-live dates to allow staff to utilize the system to avoid critical problems, such as entering the inaccurate patient information. Check to ensure that prior to product launch, all test patients are removed from the system.
- Provide additional training opportunities such as:
  - training CDs
  - online resources
  - remote login for additional training sessions

Transition into new systems

Hardware Installation & Configuration

1. **System Configuration**

- Parameter Setup
- Master Data Build
- Configuration Guide Preparation
- Customization release notes

2. **Interfacing/Integration**

- Equipment Interfaces
- Integration with other applications, if any
- Interface Document

"Mock" go-live test - a day/time where select patients are moved through the system for a period of time, or test patients are moved through the process of practice activity from check-in to check-out.

System testing – it is an absolute must for systems to be tested prior to go-live. Testing each system is essential to assure the smooth operation of the practice and prevent disruptions that could impact patient flow, provision of appropriate care, documentation requirements and the billing process.

- Network
- Interfaces – lab, radiology, billing etc.
- Hardware
- Software

2.8.3 Post-Implementation

- **Additional training:** After the several months of implementation refresher training for staff is needed.
- **New users' training:** A plan should be in place for new staff joining the practice.
- **Support Services:** After implementation level, nature and duration of support services term should be well defined.

Rationale

With increasing demand in health care, it is important to ensure that EMR implementations are successful.The failure rates of EMR implementations are also consistently high. The failure rates of EMR implementations are also consistently high. The failure rates of EHR implementation are consistently high. The existing implementation practices are studied and analyzed in order to understand various challenges faced during implementation and analyses the process of implementation.

3 Review of Literature

3.1 Electronic Health Record-Related Safety Concerns: A Cross-Sectional Survey of Electronic Health Record Users.

The rapid expansion in the use of electronic health records (EHR) has increased the number of medical errors originating in health information systems (HIS). The sociotechnical approach helps in understanding risks in the development, implementation, and use of EHR and health information technology (HIT) while accounting for complex interactions of technology within the health care system.This study addresses two important questions: "which of the common EHR error types are associated with perceived high- and extreme-risk severity ratings among EHR users?", and "which variables are associated with high- and extreme-risk severity ratings. This study was a quantitative, non-experimental, descriptive study of EHR users. We conducted a cross-sectional web-based questionnaire study at the largest hospital district in Finland. Statistical tests included the reliability of the summative scales tested with Cronbach's alpha. Logistic regression served to assess the association of the independent variables to each of the eight risk factors examined. A total of 2864 eligible respondents provided the final data. Almost half of the respondents reported a high level of risk related to the error type "extended EHR unavailability". The lowest overall risk level was associated with "selecting incorrectly from a list of items". In multivariate analyses, profession and clinical unit proved to be the strongest predictors for high perceived risk. Physicians perceived risk levels to be the highest

(P<.001 in six of eight error types), while emergency departments, operating rooms, and procedure units were associated with higher perceived risk levels (P<.001 in four of eight error types). Previous participation in eLearning courses on EHR-use was associated with lower risk for some of the risk factors. Based on a large number of Finnish EHR users in hospitals, this study indicates that HIT safety hazards should be taken very seriously, particularly in operating rooms, procedure units, emergency departments, and intensive care units/critical care units. Health care organizations should use proactive and systematic assessments of EHR risks before harmful events occur. An EHR training program should be compulsory for all EHR users in order to address EHR safety concerns resulting from the failure to use HIT appropriately**.**

3.2 GE Healthcare, Executing Best Practices for EMR Implementation, states that a formal change management process that is based on user needs. Look at that situation and plan the configuration so that we're actually fitting the practice's existing workflows. An EMR should support the work flow of physicians EMRs help by assembling the med list, linking it to the formulary, linking it to decision-support tools, vetting drug interactions, vetting allergies, making refills as simple as one click, making it all legible and creating an electronic link to the pharmacy. An EMR should have integration with **practice management system,** generating the right CPT code based on the elements of an exam so the practice could justify the charge. Practices must also transition from managing patients that come to their facility to managing a population of patients within their bundled payment group. **Hardware Consideration,** a small practice should work with its technology vendor to get perspective on available options. Think about how providers and patients move through the practice and where various devices need to be, and whether they need to be mobile or static.

3.3 K Keshavjee et al assessed Best Practices in EMR Implementation: A Systematic Review. Their integrative framework acknowledges the chronological nature of EMR implementations and considers 3 different stages of implementation: **pre-implementation**, **implementation** and **post-implementation**. The framework also acknowledges the **people**, **process** and **technologica**l issues inherent in technology implementations. They added a dynamic component to the model that allows for negotiation and dialogue as people, process and technology interact, taking into account the socio-technical aspects of change management. Considerations in pre-implementation include choosing software carefully, involvement of multiple stakeholders, selling benefits and addressing barriers, early planning, project management, governance, and technology/usability factors. Implementation phase factors include data preload and integration with other systems, workflow redesign, training, implementation assistance, feedback and dialogue, and privacy and confidentiality considerations. Post implementation factors include presence of user groups, support, presence of a business continuity plan, and presence of ongoing incentives. [10]

3.4Kathleen Roney assessed 6 Best Practices for Implementing EMR, CPOE for Meaningful Use at Montefiore Medical Center in New York City (March 29, 2012). Six best practices which the author came across were 1.Meaningful Use is not an IT project, at Montefiore, the CIO, CFO and COO are all fully engaged in MU. MU has to be approached comprehensively by the hospital — the IT department cannot do it alone.

2. Physicians need to take ownership, adopting to new technology might lower down physicians performance in initial phases, to overcome its frustration and discouragement it is important for physicians to take ownership. Involvement in the process will ease the strain and stress before positive outcomes are experienced. 3. Educate all hospital employees, physicians and staff, CIOs uses workshops and seminars to update hospital staff and physicians. Use of internal marketing and education campaigns to share information on the Meaningful Use implementation during every stage and major milestone is important. 4. Use a diverse implementation team, representatives from each department, help in understanding the requirement or system which might hinder the operation. 5. Create an optimization team, as the hospital staff learned best practices and methods, the optimization team would go back and re-train previously implemented areas with the updates from new experience. 6. Do not underestimate the power of system availability, the hospital administrators need to expect and prepare for this transition so that when a disaster occurs, they have a backup system or at least, a plan of action. [11]

3.5 Jeff Hummel et al assessed EHR Implementation with Minimal Practice Disruption in Primary Care Settings of Washington & Idaho Regional Extension Center (November 2012). The common pitfalls which author came across were **1. Leadership Issues:** Lack of unconditional leadership support with the skills, knowledge and engagement to manage the project. Poor decision-making structure, or the wrong people in leadership driving the health IT project. There was lack of good bi-directional communication between leadership and staff. Least importance was given to principles of change management**. 2. Workflow Issues:** failing to understand the importance of workflow in determining productivity, and inadequate mapping of workflow prior to go-live. No easy way to see patients and document visits prior to go live was set up. Allocation of specific roles for data gathering and data entry was not defined. Identification of gaps, bottlenecks and optimal location of devices to support workflows was not done properly. **3**. **Provider Issues,** absence of a strong clinical champion. No support from provider for the project or no participation from provider in the selection process including which devices to use. Failure of providers to understand their role in utilizing the EHR leading to counterproductive physician behaviour such as not attending user training and lack of cooperation or participation in workflow redesign efforts. **4. Training Issues**: Underestimation of the amount of training required. Failing to time the training to when users can optimally absorb it. Too much training before users has a context to understand it. Assurance that providers actually completed training was not given. No rehearsal was done before go-live. Failure to provide sufficient real-time support during go-live when the risks are greatest, the learning potential is highest and when staff need training the most**. 5. Data Interface Issues**, failure to build, test and implement all essential interfaces for lab and imaging prior to go-live. Migration of data from legacy systems and paper records into the EHR was not adequate**. 6. User Interface Issues** Failure to properly configure essential EHR features required for patient care, and to assure they are properly turned on and tested. Failure to create and test tools such as charting templates and preference lists needed to see patients, place orders and document visits. Failure to organize charting tools so care team can easily find them. Limit of amount of customization prior to go-live was not set. Failure to plan for prioritizing fixes and customization for system optimization after go-live

3.6 Karim Keshavjee et al in EMR Implementation best practices states that there needs to be a framework that perfectly fits the need of keeping medical records with interoperability amongst different frameworks. As implementation involves finance, time and energy stakeholders demand effective and successful implementation of EMR. As most of the frameworks fails to meet the requirements there are still development of framework that are explanatory and assures success. The research criteria included descriptions of EMR implementation or computerized physician order entry (CPOE) with exclusion of article which were strictly technical in nature, not physicians involved and focused on patient acceptance and articles which talked about the intent of implementation with no implementation experiences. The important aspects and phases of implementation are Pre-implementation, implementation and post implementation. Pre-Implementation phase: Success or failure depends on this phase. People governance places an integral part where higher management looks after implementation process. This phase focuses on mission, vision and top management's behaviors related to pre-implementation, implementation and post-implementation of the EMR. Implementation Phase: In this phase implementation of EMR begins. Workflows are designed. End users are trained on the application. Vendor works closely with the client to help them understand the functionality and scope of the application. Finding the loop holes and working on the fix. Planning of the initial implementation support followed with post go live support. Ensuring privacy and confidentiality measures are met. Post-Implementation phase: This phase of equal importance to ensure overall success of the EMR implementation. This phase helps fix all the issues unknown which arises after go live. This phase also focuses on enhancements. Technical support and business continuity is one of the main focuses as there needs to be measures followed to protect data and have backup if a server goes down. This phase also assist users with questions they still have even after they are done with training and using the EMR. All in all this phase a support to all the ongoing function ensuring no business impact and ensure patient safety. Once the user are familiar with the EMR and are constantly gets assistance on any issues or problems EMR implementation ensure more effective and efficient patient care and helping the hospital meet the necessary requirement from the government and help helps the organization earn incentives.

Key Research Questions

What are best available practices for implementing a successful EMR/EHR system?

What are the major challenges faced during implementation by key stake holders?

4 Objectives

General:

To Study the employee perception regarding implementation of XYZ company EMR/HER system Software.

Specific:

- To study the employee perception regarding process of EMR/EHR system implementation in a hospital by XYZ company
- To understand the major challenges faced during the process of implementation of XYZ company EMR/ EHR software

5 Methodologies

5.1 Study Design

Exploratory and Descriptive study

5.2 Data Collection

Convenient sampling method was used with a sample size of 40

Primary data from: quantitative survey analysis of major key stakeholders involved in EMR/EHR system implementation and support

Secondary data from

- Training companion of XYZ company
- User-web portal of XYZ company

6. Result

Table. 1

S.no	Question	Always (%)	Often (%)	Seldom (%)	Can't say (%)
1	Does your company finish all your projects within the given time frame?	41.67	58.33	0.00	0.00

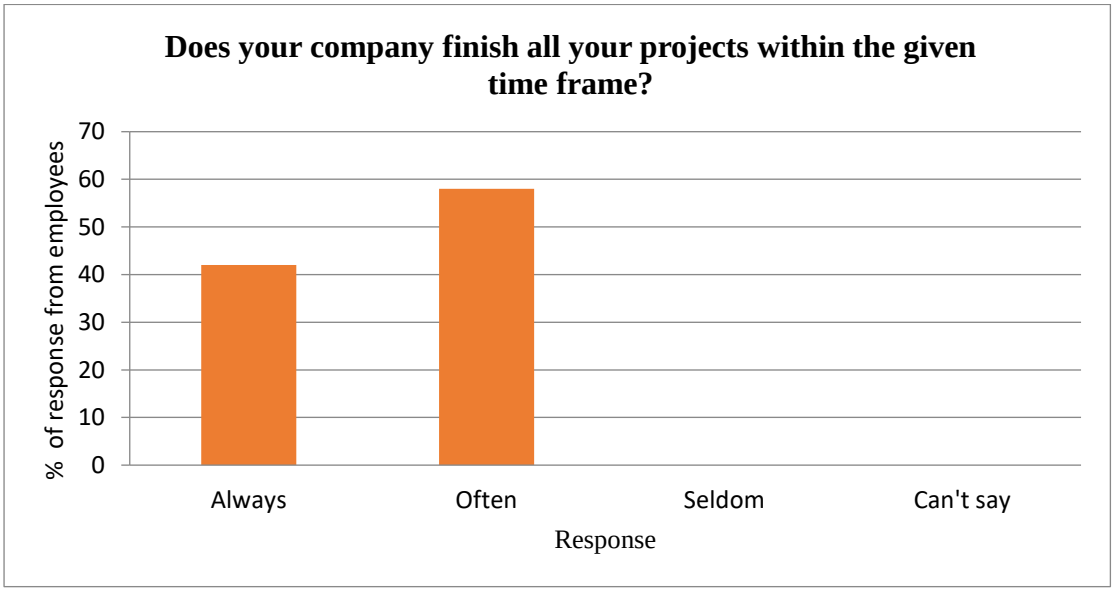

Figure 2

As per the company's employees 41.67% projects are always completed within in the given time frame while 58.33% are completed more often.

Table. 2

S.no	Question	Always (%)	Often (%)	Seldom (%)	Can't say (%)
2	Does your company finish all your projects within the given budget?	44.44	50.00	0.00	5.56

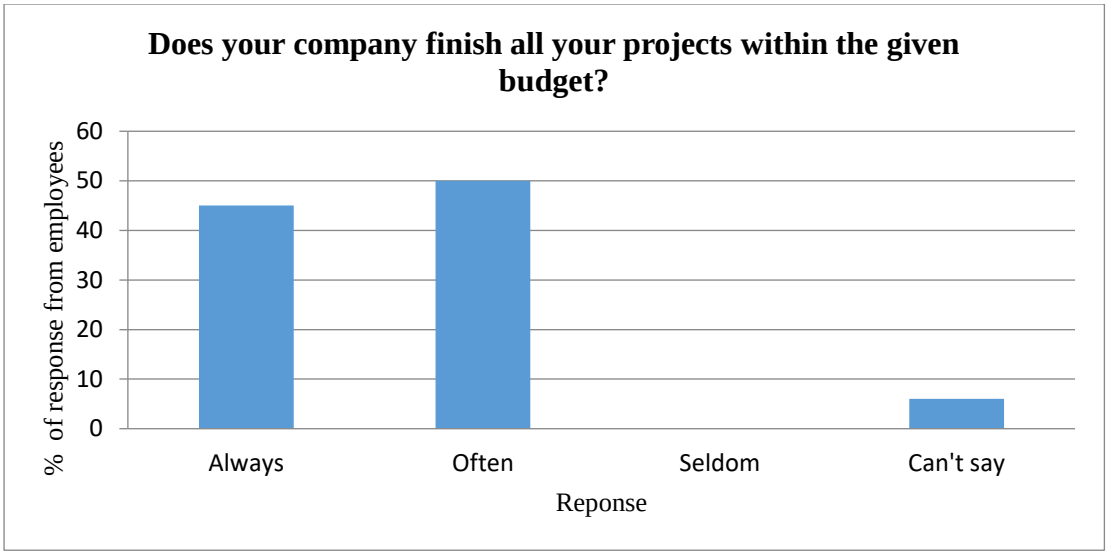

Figure 3

As per the company's employees 44.44% projects are always completed within the given budget, 50.00% are completed more often, while 5.56% don't have any idea about it.

Table. 3

S.no	Question	Always (%)	Often (%)	Seldom (%)	Can't say (%)
3	**Does your company finish all your projects within the given scope?**	**44.44**	**38.89**	**0.00**	**16.67**

Figure 4

As per the company's employees 44.44% projects are always completed within the given scope, 38.89% are completed more often, while 16.67% don't have any idea about it.

Table. 4

S.no	Question	Always (%)	Often (%)	Seldom (%)	Can't say (%)
4	**Is your product compatible with the existing application system of a given hospital?**	**44.44**	**55.56**	**0.00**	**0.00**

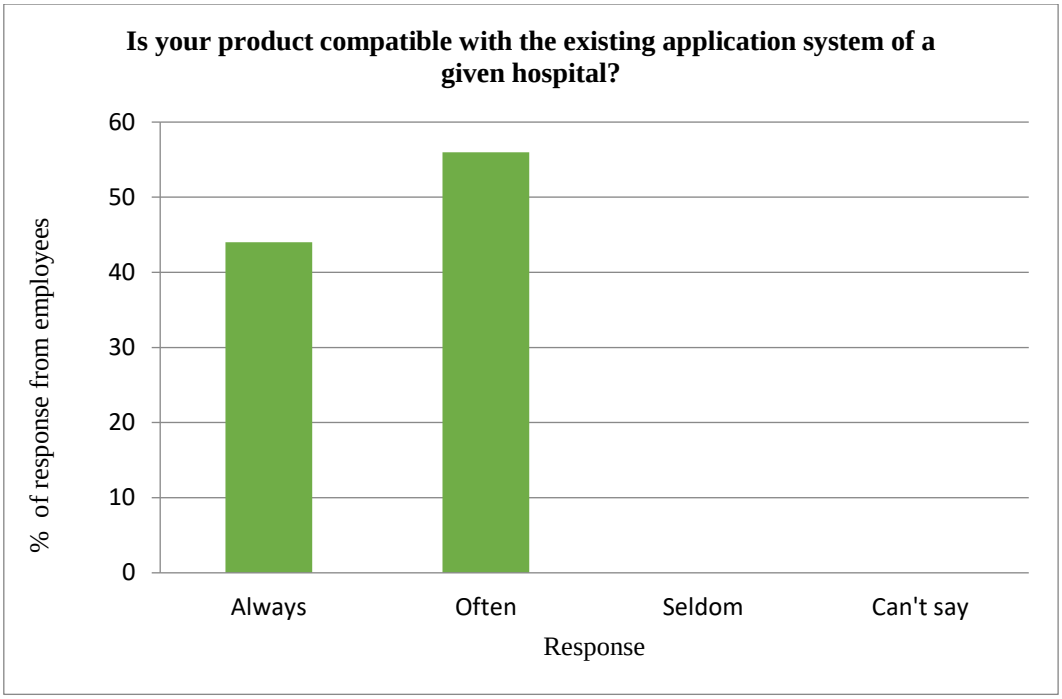

Figure 5

As per 55.56 %, the product is compatible with the existing application system of a given hospital.44.44% employees think product is always compatible with the existing application system.

Table. 5

S.no	Question	Always (%)	Often (%)	Seldom (%)	Can't say (%)
5	Is support team available once the system goes "Live" in case of any system difficulties?	94.44	5.56	0.00	0.00

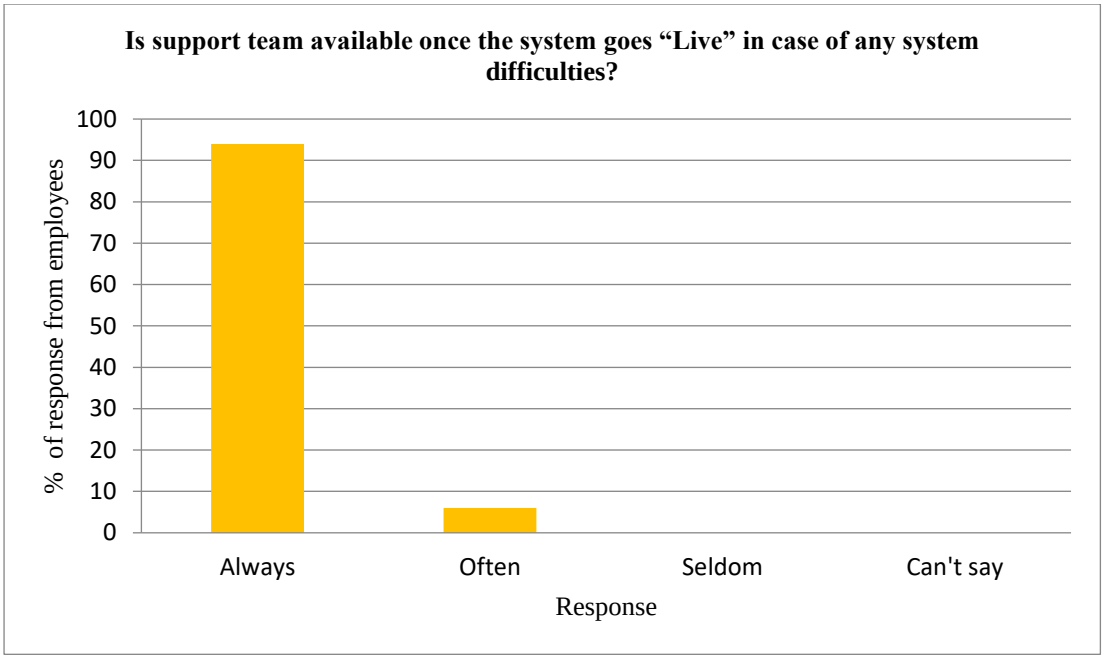

Figure 6

In 94.44% cases, the support team is available once the system goes "Live" in case of any system difficulties. In 5.56% cases the support is more often available once system goes "Live".

Table 6

S.No	Question	Yes (%)	No (%)	Can't say (%)
6	Does your company consider all aspects of implementation i.e. hardware and software?	50.00	22.00	27.00

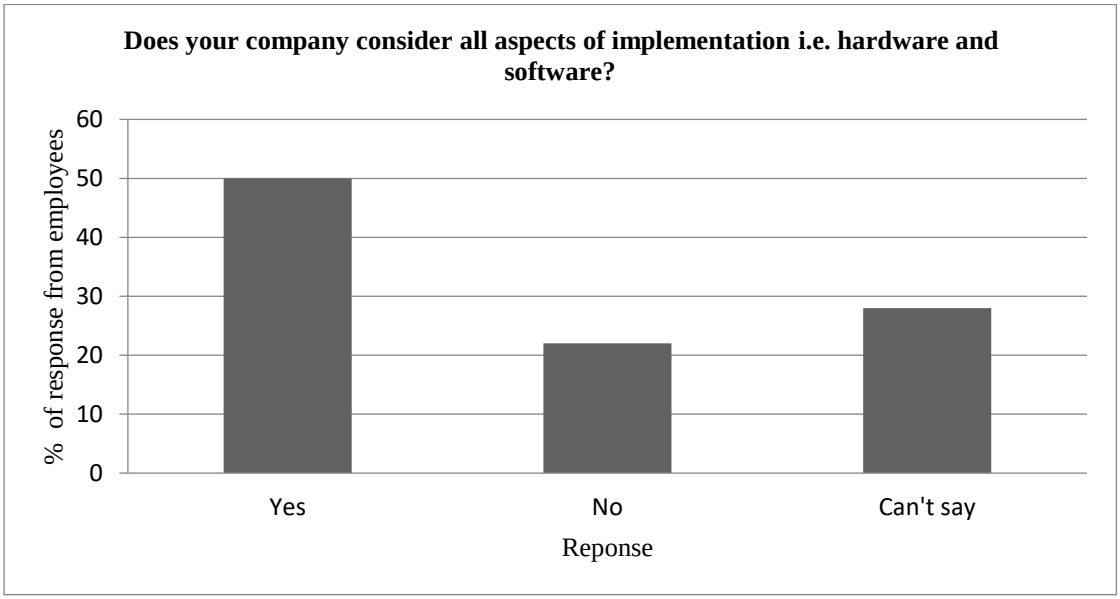

Figure 7

Around 50% thinks company considers all aspects of implantation i.e. hardware and software and 22.00% thinks company don't, while 27% don't have any idea about it.

Table 7

S.No	Question	Yes (%)	No (%)	Can't say (%)
7	Is your product used anywhere in a multi-site implementation?	94.44	0.00	5.56

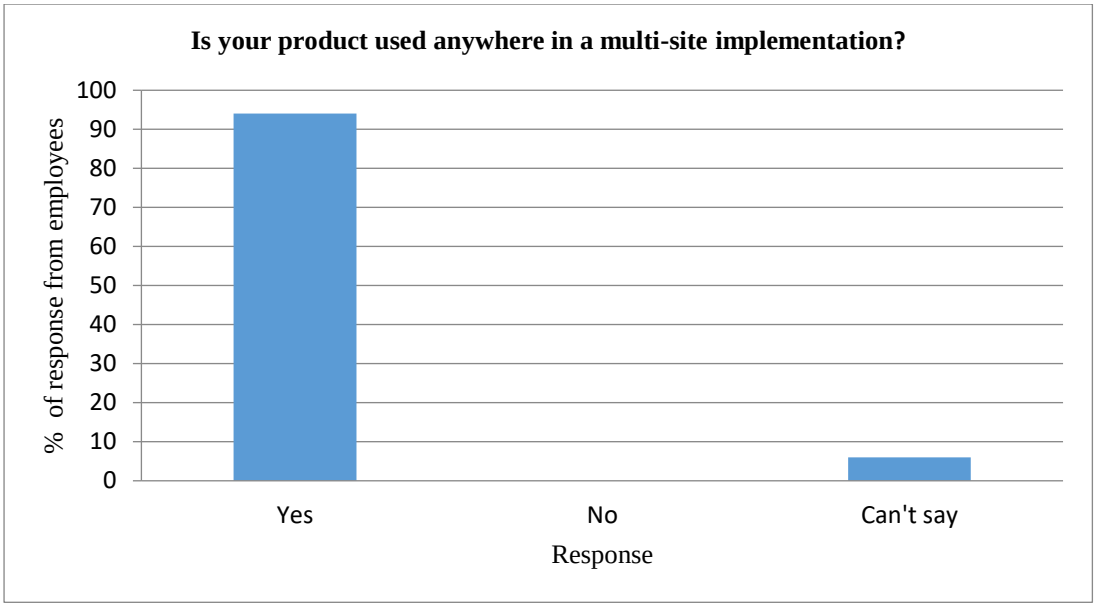

Figure 8

As per 94.44% the product is used in a multi-site implementation while 5.56% have no idea about the product usage at multi-site implementation.

Table 8

S.No	Question	Yes (%)	No (%)	Can't say (%)
8	**Do you provide customized software?**	**94.44**	**0.00**	**5.56**

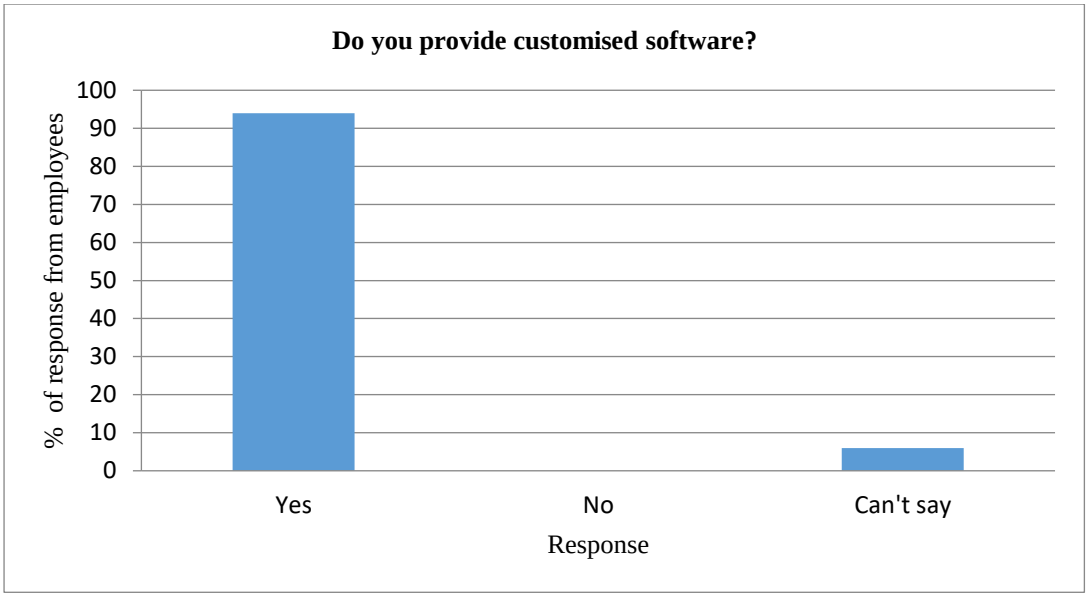

Figure 9

As per 94.44% the company provides customised software while 5.56% have no idea about the customization.

Table 9

S.No	Question	Yes (%)	No (%)	Can't say (%)
9	Does your company provide onsite training to users?	77.78	0.00	22.22

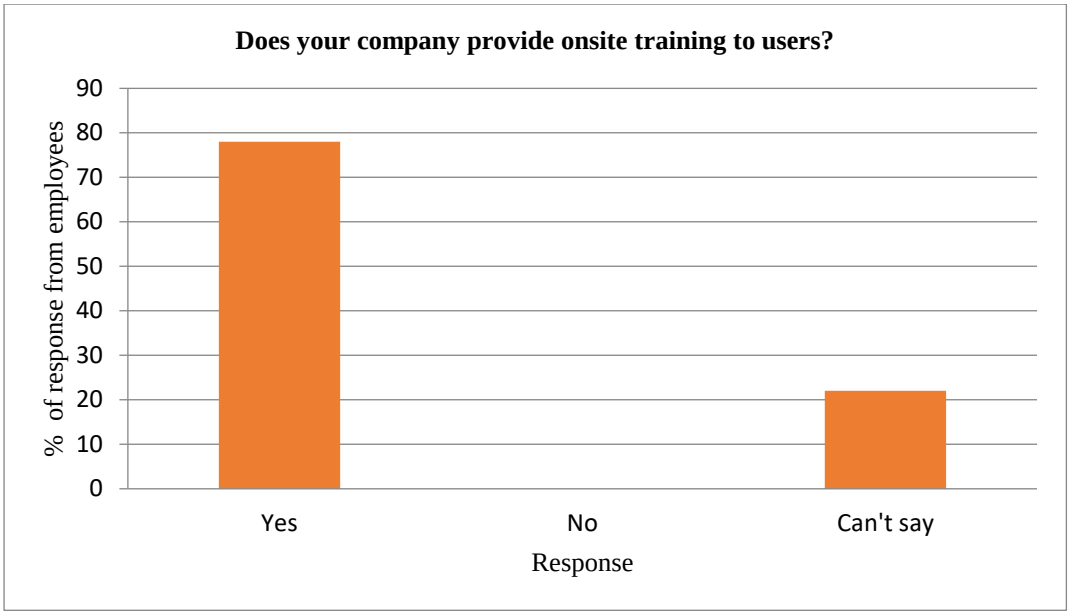

Figure 9

As per 77.78% respondents, company provide onsite training to users while 22.22% don't have idea about it.

Table 10

S.No	Question	Yes (%)	No (%)	Can't say (%)
10	Do you provide training to new users post Go-Live?	83.33	5.56	11.11

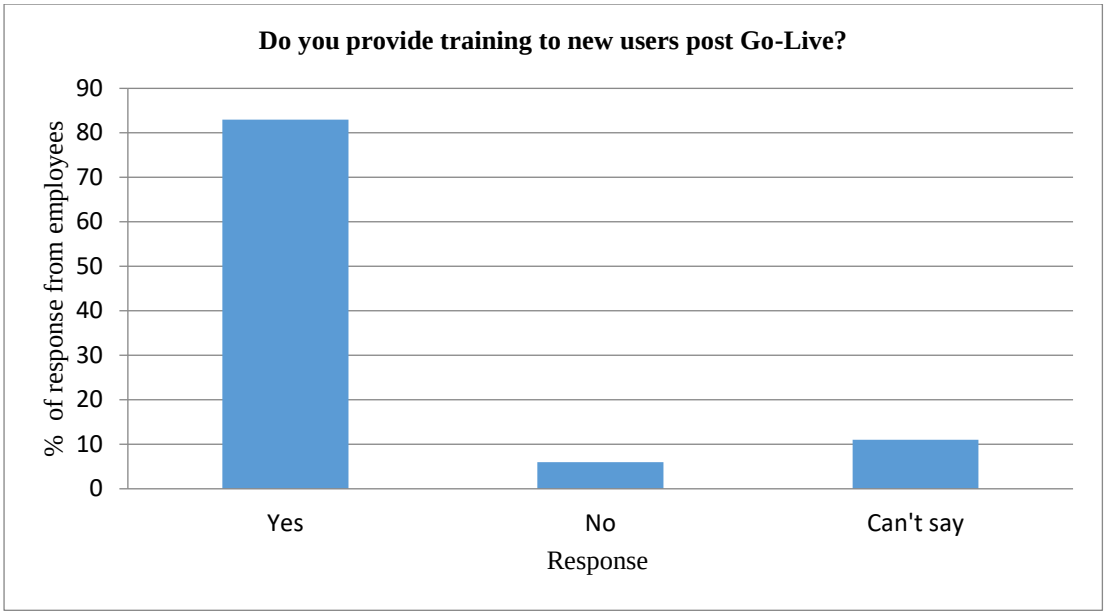

Figure 10

Post Go-Live new users are trained as per 83.33% people while 5.56 % says the company don't provide training to users Post Go- Live. 11.11% don't have any idea about the same.

Table 11

S.No	Question	Yes (%)	No (%)	Can't say (%)
11	Do you provide training manuals, on-line training sessions etc. to your users?	88.89	5.56	5.55

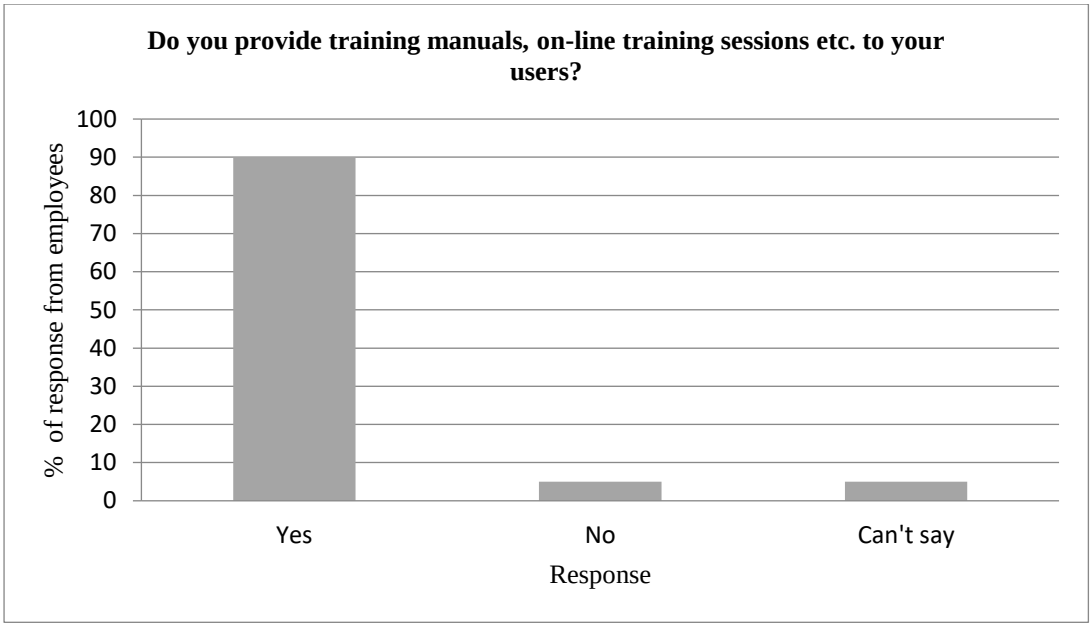

Figure 11

88.89% responses are in favour of providing training to end users, while around 5 % people says that company don't provide training to the end users and around 5 % don't have any idea.

Table 12

S. No	Questions	Individual (%)	Group (%)	Need Based (%)	All (%)
12	**If yes, then what kind of training do you provide?**	**5.26**	**0.00**	**26.31**	**57.89**

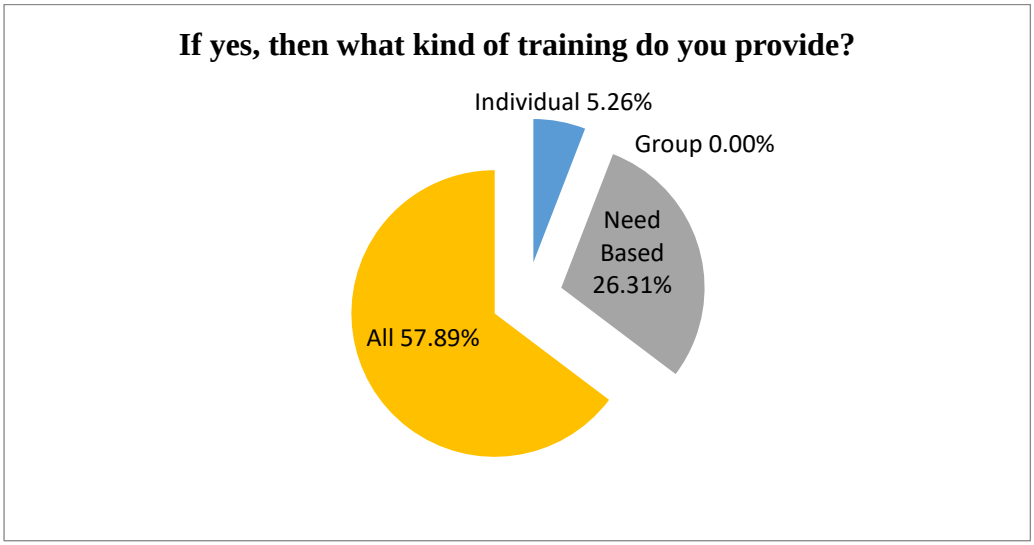

Figure 12

The company provides all sort of trainings to end users as per around 57.89%. need based training is provided to users as per around 26% people. Individual training is provided according to around 5% people and group training is not provided as per the responses.

Table 13

S.No	Question	Yes (%)	No (%)	Can't say (%)
13	Do you provide upgrades and enhancements with your product?	100	0.00	0.00

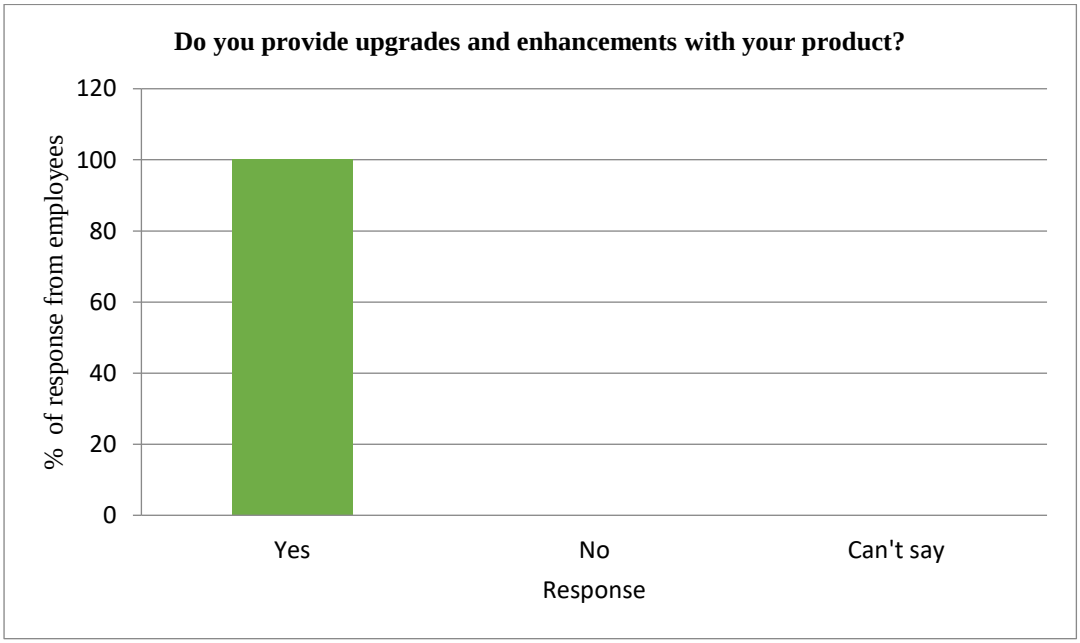

Figure 13

100% Reponses are in favour of that the company provides upgrades and enhancements with the product.

Table 14

S.No	Question	Yes (%)	No (%)	Can't say (%)
14	Does your company hold regular user and team meetings?	88.89	11.11	0.00

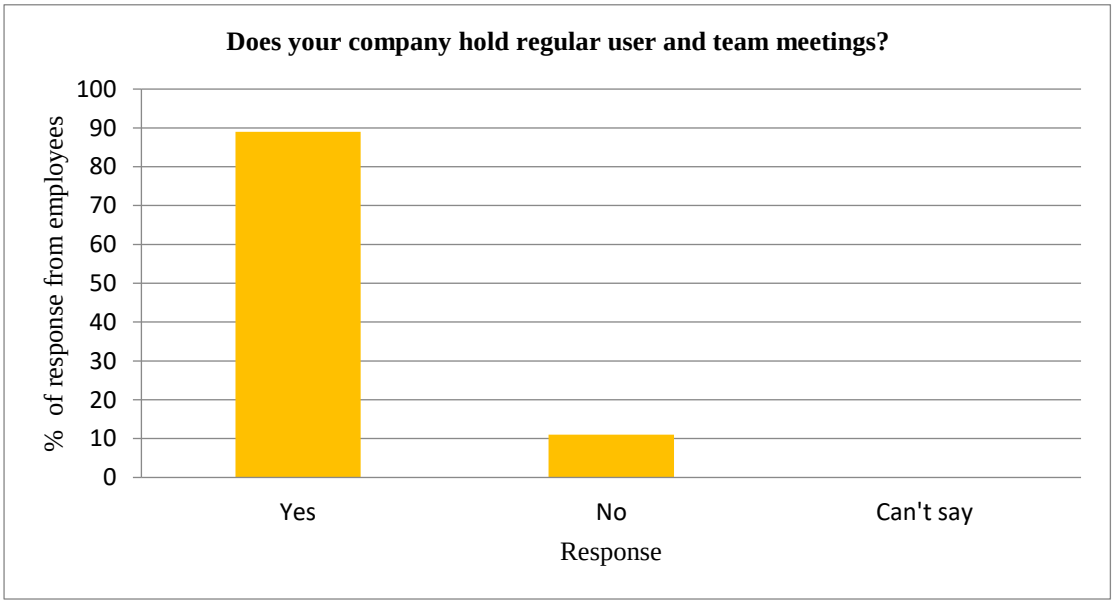

Figure 14

Company hold regular user and team meetings as per 88.89% while 11.11% says the company don't.

Table 15

S.No	Questions	Daily (%)	Every alternate day (%)	Once in a week (%)	Once in two weeks (%)
15	If yes, what is the frequency of these meetings?	10.52	15.78	57.89	10.52

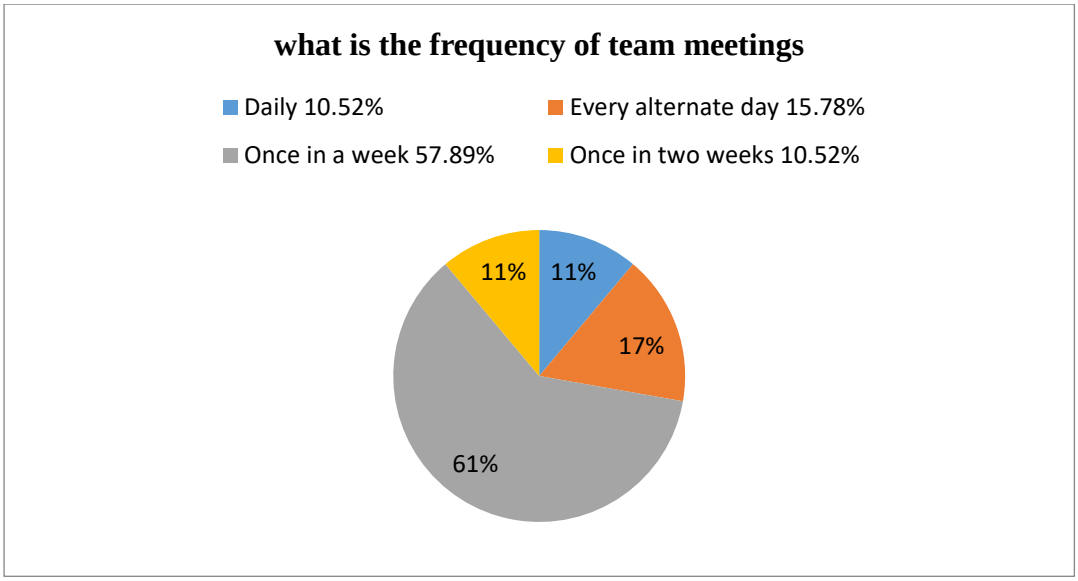

Figure 15

Team meetings are held on weekly basis as per 61% responses, on every alternate day as per 15.78% people and once in a week or on daily basis as per around 11% people.

Table 16

S.No	Question	Yes (%)	No (%)	Can't say (%)
16	**Does your product comply with all current and future federal and state mandates**	**100**	**0.00**	**0.00**

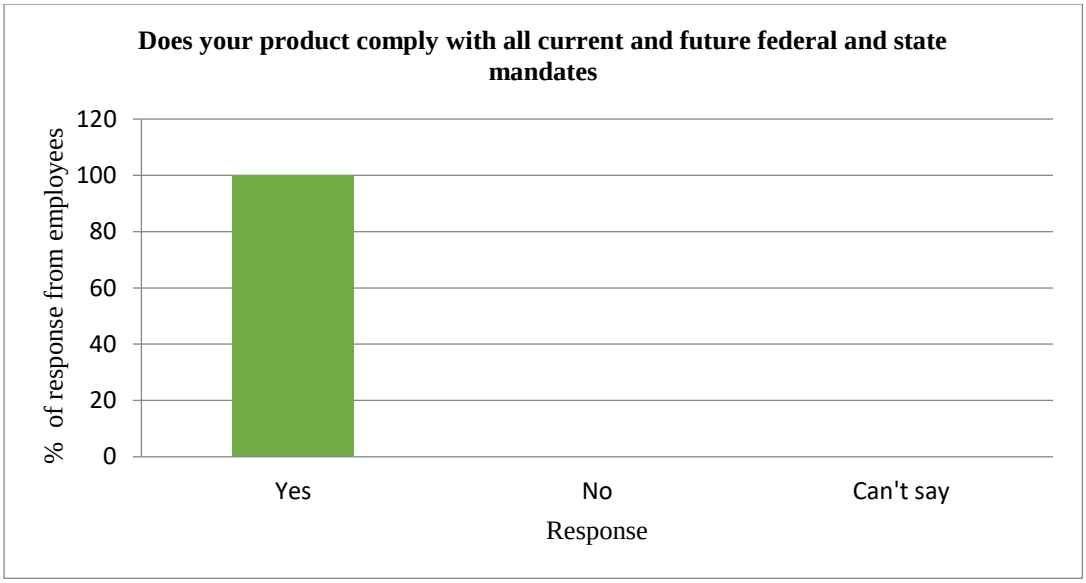

Figure 16

The company complies all current and future federal and state mandates as per 100% respondents.

Table 17

S.no	Questions	Complete package (%)	Module wise (%)	Both (%)
17	**Is your product sold modularly or does it need to be purchased as a complete package**?	**16.67**	**33.33**	**50.00**

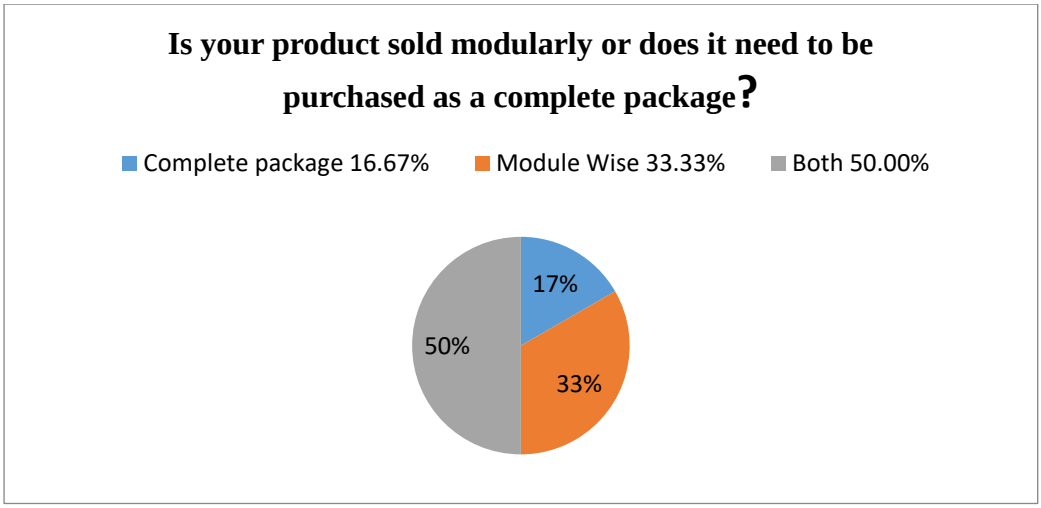

Figure 17

16.67% people says that the product is sold as a complete package, while 33.3% says it is sold module wise. As per 50%, the product is sold in both ways, module wise and as a complete package as well.

Table 18

S.no	Question	Data Migration (%)	System Configuration (%)	Interfacing/ Integration (%)	Requirement gathering (%)
18	During the process of EHR/EMR transition what is the most common difficulty you face	13.33	13.33	48.90	24.44

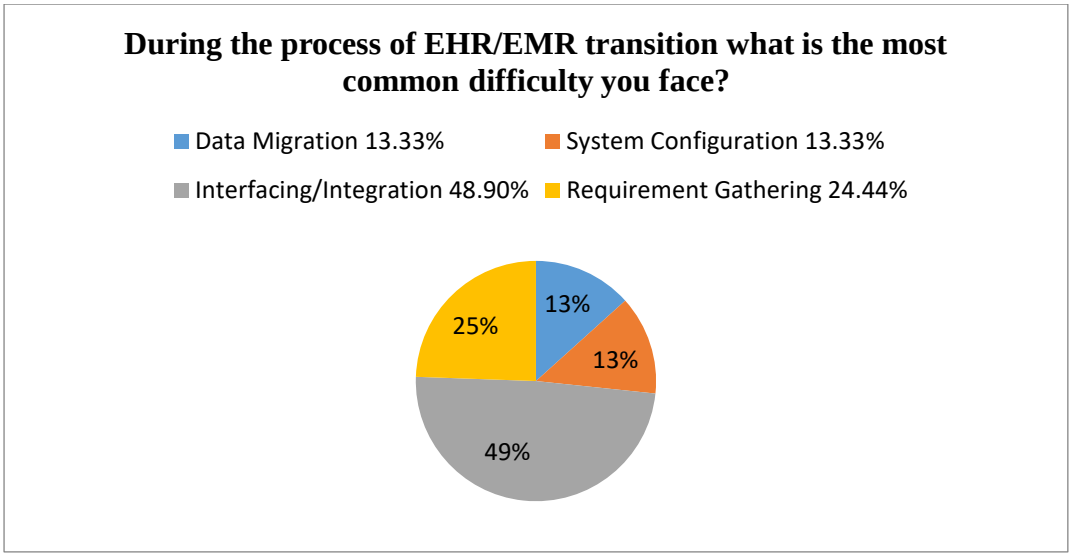

Figure 18

Interfacing/Integration is the most difficult task as per 48.90% people during the process of EHR/EMR transition followed by requirement gathering which constitutes around 25%. System configuration and Data migration both have almost similar difficulty as per 13.33% people.

Table 19

S.No	Questions	Gap analysis	Technical incompetency	Scope Creep	High expectations
19	**What are the main issues you faced during requirement gathering**	**43.52**	**15.78**	**25.89**	**14.81**

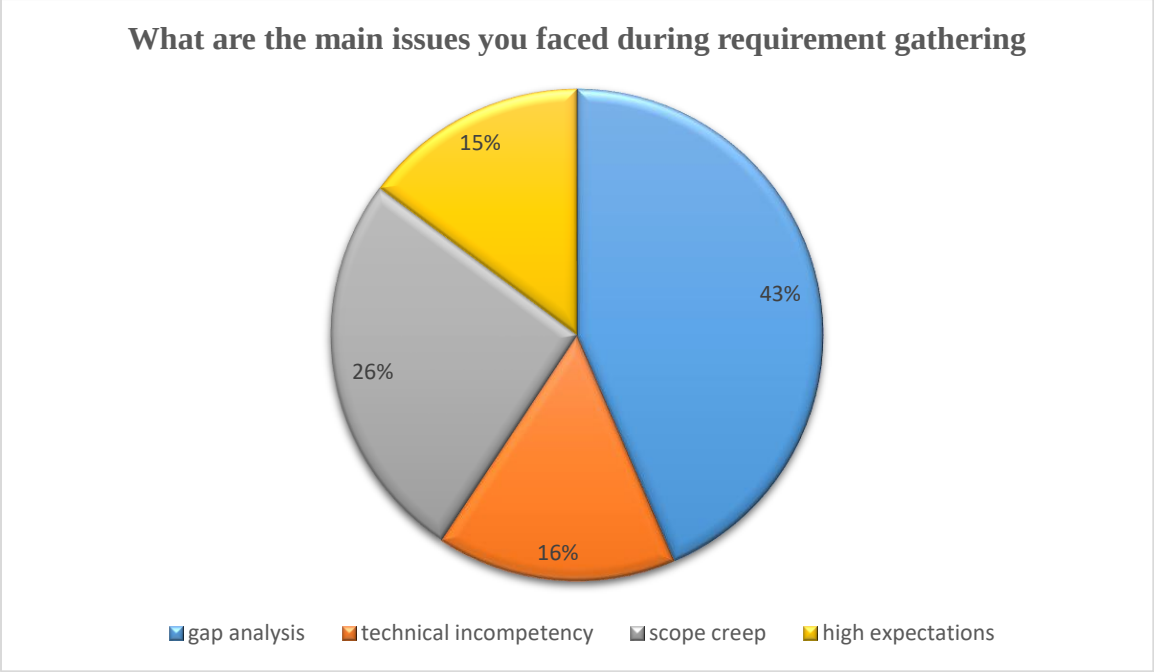

Figure 19

Gap analysis was the most common issue around 43% faced during requirement gathering followed by scope creep of around 26%. Technical incompetency and high end user expectations are another factors contributing around 15 % each.

Table 20

S.No	Questions	Scoop creep	Unclear requirements	Upgrades	Base content insufficiency
20	**What are the main challenges of configuration**	**20.48**	**27.78**	**30.89**	**20.85**

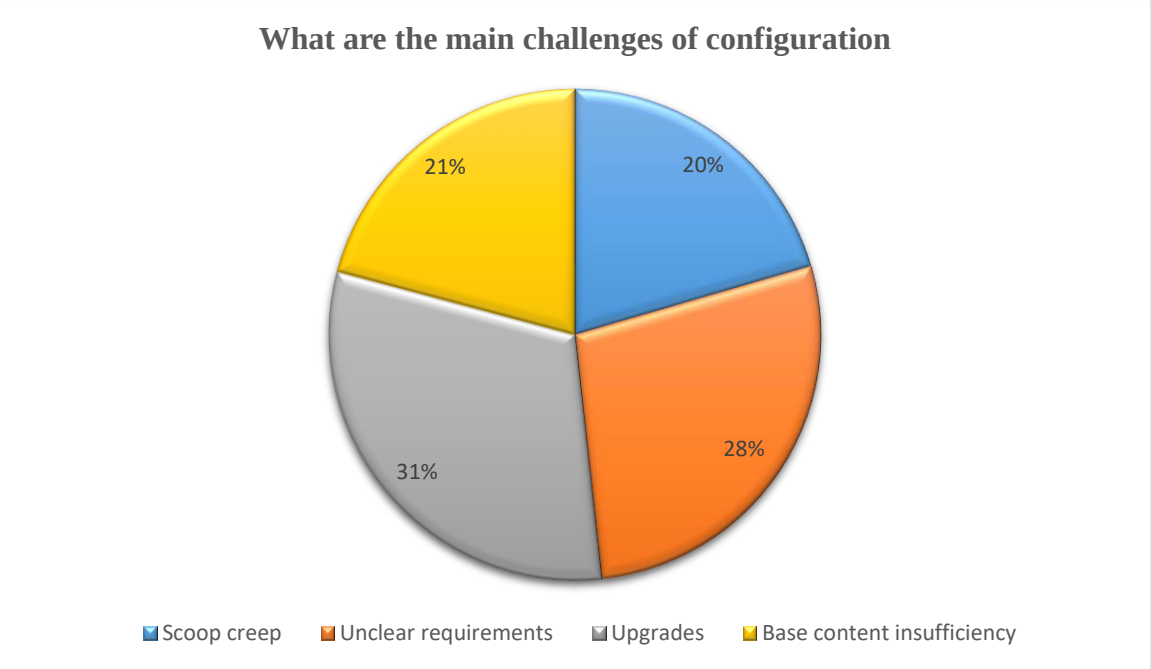

Figure 20

Upgrades in the application constitutes around 31% of issues faced during configuration followed by unclear requirements of around 28%. Scoop creep and base content insufficiency constitutes around 20% each.

7.Findings

58% of employees agreed that their company finish all of their projects within the given time frame very often and 41.67% agreed that they always finish their projects within the given time frame. 44.44% agreed that they always finish their projects within the given budget and scope. 16.67% couldn't say about the finishing the projects in the given time frame.

As per the employees company's product is 55.56% often compatible with the existing application of a given hospital. 94.44% times Support team is available once the system goes Live in case of any system difficulties.

As per the Employees Company considers all aspects of implementation i.e. hardware and software was agreed by 50%, 22% said No and 27% couldn't say. The product is used for multi-site implementation (94.44%).

Onsite training is available to users (77.78%), training to new users is available post Go-Live 83.33%. Training manuals, online sessions etc are available (88.89%). 100% upgrades and enhancements are available with the product.

Employees say company hold regular user and team meetings 88.89% times. The product is in 100% compliance with all current and future federal and state mandates. Company provide flexibility to its users to buy their product as a Complete package (16.67%), Module wise (33.33%), Both (50%).

Most common difficulty faced during EHR/EMR transition was Interfacing and Integration (48.90%) followed by Requirement gathering (24.44%), then System configuration and Data Migration (both 13.33%)

Company provides training to its users which are Individual 5.26%, Need Based 26.31%, Group 0.00% and All 57.89%. Company holds regular team meetings Once in a week (57.89%), Every alternate day (15.78%), Daily (10.52%) and Once in two weeks (10.52%).

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Discussion

Company employees are always under the pressure to deliver the services on time, within budget and scope with no compromise with the quality. Lack of unconditional leadership support with the skills, knowledge and engagement to manage the implementation process. Close to 50% of implementations fail, causing significant financial losses, lost opportunities for improved patient care and significant anguish for implementers, clinicians and senior managers.

8. Recommendations

1. Looking at XYZ company profile where multiple projects are handled simultaneously, it can be said that Agile methodology of EHR/EMR implementation is best suited.

2. It is advisable to conduct a regular team meeting on daily basis as it will help in better understanding of goals by the employees which ultimately helps in achieving the goals.

3. It is advisable to take the sign off from all the clients and not to take any new requirements after that.

8. Conclusion

The study shows positive results, showing the employee perception regarding the implementation practices followed are satisfactory. XYZ company have good hold on its products. XYZ company caters all the variables used. The product is in 100% compliance with all current and future federal and state mandates. As per the employees Company provides 100% upgrades and enhancements to its clients. Almost 100% support services are available (94.44% always and 5.56% often). Company have a Help Desk which provide 24X7 supports to their clients which is immediately and easily be accessed by clients over a phone call. Most common difficulty faced during EHR/EMR transition was Interfacing and Integration (48.90%).

Onsite training is available to users (77.78%), training to new users is available post Go-Live 83.33%. Company considers all aspects of implementation i.e. hardware and software which mainly includes operating system requirements, RDP, hardware which is compatible with the software**.** Frequency and depth of upgrades is based on client's requirements, as a product upgrades are done annually.

10. References

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Appendix

Questionnaire

Q1. Does your company finish all your projects within the given time frame?

a) Always
b) Often
c) Seldom
d) Can't say

Q2. Does your company finish all your projects within the given budget?

a) Always
b) Often
c) Seldom
d) Can't say

Q3. Does your company finish all your projects within the given scope?

a) Always
b) Often
c) Seldom
d) Can't say

Q4. Is your product compatible with the existing application system of a given hospital?

a) Always
b) Often
c) Seldom
d) Can't say

Q5. Is support team available once the system goes "Live" in case of any system difficulties?

a) Always
b) Often
c) Seldom
d) Can't say

Q6. Does your company consider all aspects of implementation i.e. hardware and software?

a) **Yes**
b) **No**
c) **Can't say**

Q7. Is product used anywhere in a multi-site implementation?

a) **Yes**
b) **No**
c) **Can't say**

Q8. Do you provide customized software?

a) **Yes**
b) **No**
c) **Can't say**

Q9. Does your company provide onsite training to users?

a) **Yes**
b) **No**
c) **Can't say**

Q 10. Do you provide training to new users?

a) **Yes**
b) **No**
c) **Can't say**

Q11. Do you provide training manuals and online sessions etc to your users?

a) **Yes**
b) **No**
c) **Can't say**

Q12. If yes, then what kind of training do you provide?

a) **Individual**
b) **Group**
c) **Need based**
d) **All of the above**

Q13. Do you provide upgrades and enhancements with your product?

a) **Yes**
b) **No**
c) **Can't say**

Q14. Does your company hold regular user and team meetings?

a) **Yes**
b) **No**
c) **Can't say**

Q15.If yes, what is the frequency of these meetings?

a) **Daily**
b) **Every alternate day**
c) **Once in a week**
d) **Once in two weeks**

Q16. Does your product comply with all current and future federal and state mandates?

a) **Yes**
b) **No**

Q17. Is your product sold modularly or does it need to be purchased as a complete package?

a) **Module wise**
b) **Complete Package**
c) **Both**
d) **Can't say**

Q18. During the process of EHR/EMR transition what is the most common difficulty?

a) **Data migration**
b) **System Configuration**
c) **Interfacing/Integration**
d) **Requirement gathering**

Q19. What are the main issues you faced during requirement gathering?

a) Gap analysis
b) Technical incompetency
c) Scope Creep
d) High expectations

Q20. What are the main challenges of configuration?

a) **Scope creep**
b) **Unclear requirements**
c) **Upgrades**
d) **Base content insufficiency**