Internship Training

at

TrioTree Innovations Pvt Lmt

Enhancing Clinical Workflow: A User-Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module at Saroj Group of Hospitals

by

Name: Dr. Harsh Aggarwal

Enroll No. PG/22/142

Under the guidance of

Dr. Punit Yadav

PGDM (Hospital & Health Management)

2022-24

International Institute of Health Management Research
New Delhi

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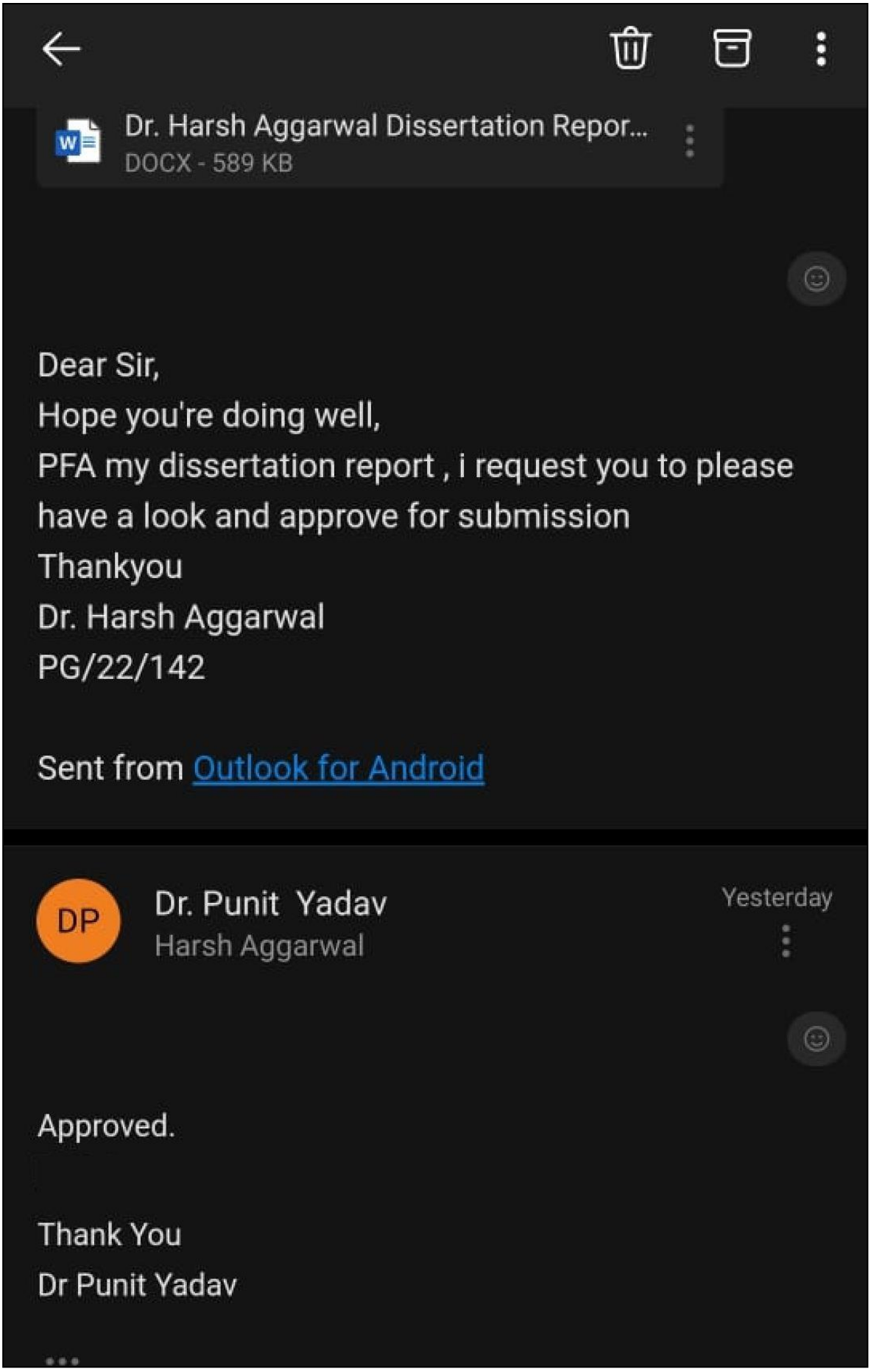
ACKNOWLEDGEMENT

Above all and everyone, I thank the almighty and my parents for their love, support and everything.

Any attempt at any level, cannot be satisfactorily completed without the support andthe guidance of learned people. I owe a great debt to all the professionals at TrioTree Pvt Lmt for sharing generously their knowledge and time that inspiredme to do my best during the summer internship.

I would like to express my sincere gratitude to my mentor **Dr. Zunjar Gaupale** and my team and all the staff at TrioTree for their continuous guidance who in spite of being busy with their duties , took time to hear me and guide me and gave helpful advice and constructive comments throughout the project . Their valuable inputs made this project possible.

I am glad to acknowledge **Dr. Punit Yadav** Associate Professor, IIHMR Delhi who is my mentor for incorporating right attitude into me towards learning and for helping and supporting whenever required.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(Completion of Dissertation)

The certificate is awarded to

Dr. Harsh Aggarwal

in recognition of having successfully completed his Internship in the department of

Functional Team (Implementation)

and has successfully completed his Project on

"Enhancing Clinical Workflow: A User-Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module at Saroj Group of Hospitals"

Date: 20 May 2024

TrioTree Innovations Pvt Lmt

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

We wish him/her all the best for future endeavors.

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Certificate of Approval

The following dissertation titled "**Integrating Natural Language Processing with Clinical Decision Support System: A Scoping Review**" at "**Healthficial**" 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 PGDM (Hospital & Health 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
Dr. Shiv.	
Dr. Sukesh	
Dr. Vishal	

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Harsh Aggarwal** student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at **TrioTree Innovations Pvt Lmt** from **19 Feb 2024** to **19 July 2024**

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

The Internship is in fulfillment of the course requirements

I wish him all success in all his/her future endeavors.

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Dr. Punit Yadav
Associate Professor
IIHMR, New Delhi

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Harsh Aggarwal** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. He is submitting this dissertation titled ***"Enhancing Clinical Workflow: A User-Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module at Saroj Group of Hospitals"*** at "TrioTree" in partial fulfillment of the requirements for the award of the **PGDM (Hospital & Health 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.

Dr. Punit Yadav
Associate Professor
IIHMR, Delhi

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled ***"Enhancing Clinical Workflow: A User Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module at Saroj Group of Hospitals"*** and submitted by **Dr. Harsh Aggarwal** Enrollment No. **PG/22/142** under the supervision of **Dr. Punit Yadav**

for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from **20 March 2024** to **20 May 2024**

embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

FEEDBACK FORM

Name of the Student: Dr. Harsh Aggarwal

Name of the Organization: Triotree Organization.

Area of Dissertation: Functional Team Implementation

Attendance: Satisfactory.

Objectives achieved → Basic Knowledge of Hospital Workflow
→ Implementation.
→ Requirement Management

Deliverables:
↳ Implementation of Projects, statistical analysis & Testing

Strengths:
Keen to work, Sincerity.

Suggestions for Improvement: NA

Suggestions for Institute:

Zunjar G.

Signature of the Organisation Mentor

Dr. Zunjar Gaupale
Clinical Transformation

Date: 20 June 2024.

Place: Triotree

Contents

Acronyms/Abbreviations

PGDHM	Post Graduate Diploma in Hospital Management
CDSS	Clinical Decision Support System
NLP	Natural Language Processing
HMIS	Hospital Management Information System
HIS	Health Information System
MLC	Medico Legal Cases
EMR	Electronic Medical Record
EHR	Electronic Health Record
MRD	Medical Record Department
TAT	Turn Around Time
PSAT	Patient Satisfaction
AI	Artificial Intelligence

SECTION - 1

Introduction

As an integral part of the PGDHM course, the intership training helps us to understand the overall functioning of the hospitals and IT sector from a managerial point of view. Keeping this factor in view, I tried to visit different hospital departments in various units of Saroj Hospitas, Delhi, with a special focus on understanding the various procedures. I worked as an intern in Implementation consultant over there.

The **Aim** of the summer training is:

"To study the administrative and managerial functioning and workflow of the Hospital."

The **Objectives** of summer training are:

- To learn the daily operational management of the Organization and its various departments/areas.
- To identify issues/problems associated with some specific departments/areas.
- To undertake the special tasks assigned to me.

Organization Profile

TrioTree Technologies Pvt. Ltd.

TrioTree Technologies Pvt. Ltd. is a healthcare-focused software development company located in Noida, India. Information readily available online suggests they specialize in Hospital Information Systems (HIS), Clinical Management Systems (CMS),and other healthcare IT solutions (http://triotree.com/).

About TrioTree

Our vision is to revolutionize the quality and efficiency of everyday patient experiences with the convergence of healthcare

THE TREE represents the growing state of the company - A strong organic growth.

THE TRUNK the fusion of three unique identities joining in a triple helix, uniting towards a single foliage. The identities being very different in character - strong and vibrant on their own.

THE FOLIAGE represents the united energy. The bubbles - new ideas expanding, taking shape.

OUR SPIRIT- United, Strong, Ideating...

Daily Key Responsibilities:

- Implementation of the EMR in various hospitals
- Testing of the Day to day updation of the software
- Business Analysis
- Requirement gathering
- BRD creation and testing
- Creating test scenarios
- SRS Documentation and Flow Chart creation.

Conclusion

- Significant opportunity for learning
- Valuable professional skills in the field of healthcare management
- Exposure to diverse tasks and responsibilities
- Better understanding of the complex roles and responsibilities

Limitation

- Limited exposure to various aspects of hospital administration
- Not actively involved in major decision-making processes

Abstract

This report presents an in-depth analysis of the usability and impact of the Health Management Information System (HMIS) Clinical Module on healthcare professionals' workflows and patient interactions. The study was conducted through a survey of 100 healthcare professionals, including doctors, nurses, lab technicians, pharmacists, administrative staff, and others. The survey aimed to evaluate various aspects of HMIS, including user-friendliness, ease of navigation, data entry efficiency, adequacy of features, training and support, and overall

satisfaction.

Key findings indicate that while the majority of respondents found the HMIS somewhat user-friendly, significant challenges remain, particularly in data entry efficiency and system navigation. Resistance to change was notably high among doctors and paramedics, highlighting the need for targeted change management strategies. Although the system has improved workflow efficiency for a considerable portion of users, its impact on patient interaction requires further optimization to minimize disruptions.

The analysis reveals that while the HMIS has potential benefits, there are critical areas for improvement. Enhancing the user interface, streamlining data entry processes, and providing robust training and ongoing support are essential to increase user satisfaction and system adoption. The report concludes with recommendations to address these issues and improve the overall effectiveness of the HMIS Clinical Module in healthcare settings.

SECTION – 2

PROJECT REPORT

ON

"Enhancing Clinical Workflow: A User-Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module at Saroj Group of Hospitals

Introduction

Hospitals rely heavily on efficient information management to deliver quality patient care.

Hospital Management Information System (HMIS)

A Hospital Management Information System (HMIS) is a software application designed to streamline and automate various functions within a hospital or healthcare organization. It acts as a central hub for managing administrative, clinical, and financial operations.

Key functionalities of an HMIS include:

- **Patient Management:**
  - Registration and admission processes
  - Demographics and medical history tracking
  - Appointment scheduling and tracking
  - Discharge planning
- **Clinical Management:**
  - Electronic Health Records (EHR) management
  - Physician order entry
  - Clinical decision support systems (CDSS) integration
  - Lab and radiology results tracking
  - Medication administration management
- **Financial Management:**
  - Billing and coding
  - Insurance claims processing
  - Accounts receivable and payable management
  - Inventory management for medical supplies and pharmaceuticals
- **Administrative Management:**
  - Human resource management (payroll, scheduling)
  - Reporting and analytics
  - Bed management
  - Resource allocation

Benefits of Implementing an HMIS:

- **Improved Efficiency:** Automates administrative tasks, improves data accuracy and accessibility, optimizes workflows, and reduces manual processes.

- **Enhanced Patient Care:** Streamlines patient registration, facilitates access to medical records, and enables better communication between healthcare providers.
- **Better Financial Management:** Streamlines billing and coding processes, reduces errors, and improves revenue collection.
- **Informed Decision Making:** Provides real-time data and reporting for performance analysis and resource allocation.
- **Improved Regulatory Compliance:** Ensures adherence to data privacy regulations like HIPAA (Health Insurance Portability and Accountability Act).

Considerations for Implementing an HMIS:

- **Cost:** Selecting, implementing, and maintaining an HMIS can be expensive.
- **System Integration:** Ensuring seamless integration with existing infrastructure and other healthcare IT systems is crucial.
- **Data Security:** Implementing robust security measures to protect sensitive patient data is essential.
- **User Training:** Training staff on the HMIS is crucial for successful adoption and user acceptance.

Overall, a well-implemented HMIS can significantly enhance the overall efficiency and effectiveness of a hospital or healthcare organization. It can improve patient care, streamline processes, and provide valuable data for informed decision-making.

EMR stands for Electronic Medical Record. It's a digital version of a traditional paper chart that contains a patient's medical history, diagnoses, medications, allergies, immunizations, and other relevant health information.

Here's a breakdown of EMR functionalities and key points:

Functionalities:

- Stores a comprehensive record of a patient's medical history across different healthcare providers (if the EMR systems are interoperable).
- Provides easy access to patient information for authorized healthcare professionals, improving collaboration and care coordination.
- Facilitates faster and more accurate diagnoses and treatment planning.
- Enables secure storage and retrieval of medical records, reducing the risk of loss or damage.
- May integrate with other healthcare IT systems like laboratory and radiology systems, streamlining workflows.

Benefits:

- **Improved patient care:** Provides a more complete picture of a patient's health history, leading to more informed treatment decisions.
- **Increased efficiency:** Reduces time spent searching for paper charts and allows for faster retrieval of medical information.
- **Enhanced communication:** Facilitates better communication between healthcare providers involved in a patient's care.
- **Reduced costs:** Eliminates the need for paper charts and storage space.

- **Improved medication safety:** Reduces the risk of medication errors by providing a complete list of a patient's medications and allergies.

BACKGROUND:

- TrioTree Technologies is a leading provider of healthcare information technology (IT) solutions, particularly focusing on Hospital Management Information Systems (HMIS). Founded by a team of doctors and engineers with extensive healthcare experience, TrioTree offers a suite of software products designed to streamline clinical workflows and improve overall healthcare delivery.

Abstract

This report presents an in-depth analysis of the usability and impact of the Health Management Information System (HMIS) Clinical Module on healthcare professionals' workflows and patient interactions. The study was conducted through a survey of 100 healthcare professionals, including doctors, nurses, lab technicians, pharmacists, administrative staff, and others. The survey aimed to evaluate various aspects of HMIS, including user-friendliness, ease of navigation, data entry efficiency, adequacy of features, training and support, and overall satisfaction.

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Rationale

This project explores the challenges faced by healthcare providers during the implementation of the HMIS Clinical Module, aiming to improve clinical workflow efficiency and adaptation of the HMIS in the organization

Understanding these challenges will inform the development of user- centered solutions to optimize HMIS usability and enhance clinical workflows.

Literature Review

The implementation of Hospital Management Information Systems (HMIS) has been a significant advancement in the healthcare industry, aiming to enhance efficiency, data management, and patient care. However, the introduction of such systems is often accompanied by a range of challenges that can either hinder or improve clinical workflows.

This literature review delves into various studies highlighting these challenges and the potential benefits of successful HMIS implementations.

Challenges of HMIS Implementation

1. Complex Interfaces
    - Usability Issues: Many studies have highlighted that the complexity of HMIS interfaces can pose significant usability challenges for healthcare providers. Poorly designed interfaces can lead to increased cognitive load, errors, and frustration among users (Ammenwerth et al., 2003).
    - Learning Curve: The steep learning curve associated with complex systems often results in resistance from staff who are accustomed to traditional methods of documentation and data management (Holden, 2010).
2. Workflow Disruptions
    - Integration Issues: The integration of HMIS with existing workflows is a critical challenge. Inadequate integration can disrupt clinical processes, leading to inefficiencies and increased workloads (McGinn et al., 2011).
    - Adaptation Period: Transitioning to a new HMIS requires an adaptation period during which productivity may decline as users become familiar with the new system (Campbell et al., 2009).
3. Data Quality Concerns
    - Inconsistent Data Entry: Inconsistencies in data entry practices can compromise the quality of data within the HMIS, impacting clinical decision-making and patient outcomes (Kellermann & Jones, 2013).
    - Data Integrity: Ensuring data integrity and accuracy is paramount. Errors in data entry or system glitches can lead to critical mistakes in patient care (Bowman, 2013).

Benefits of Successful HMIS Implementations

1. User-Centered Design
    - Involvement of Healthcare Providers: Successful HMIS implementations often involve healthcare providers in the design and development process. This ensures that the system meets the practical needs of its users and fits seamlessly into their workflows (Preece et al., 2015).
    - Customization and Flexibility: Systems that allow for customization and flexibility in workflows are more likely to be adopted successfully. Tailoring the HMIS to specific clinical practices can enhance user satisfaction and efficiency (Adler-Milstein et al., 2013).
2. Comprehensive Training
    - Empowerment through Training: Providing comprehensive training programs empowers users to navigate the system's functionalities effectively. Training reduces resistance to new technology by building user confidence and competence (Boonstra & Broekhuis, 2010).
    - Ongoing Support: Continuous support and refresher training sessions help address issues as they arise, ensuring sustained system use and proficiency (Gagnon et al., 2012).
3. Flexibility in Workflows
    - Personalization of Workflows: Allowing users to personalize workflows and data entry processes can lead to better adoption rates. Flexibility in the system

design accommodates diverse clinical practices and preferences (Greenhalgh et al., 2009).

- Improved Efficiency: Systems that are flexible and user-friendly can significantly improve workflow efficiency, reducing the time spent on administrative tasks and allowing more focus on patient care (Buntin et al., 2011).

Understanding User Experiences

By understanding user experiences and incorporating the factors mentioned above, HMIS can become a valuable tool for optimizing clinical workflows, improving data quality, and ultimately enhancing patient care. Studies suggest that when healthcare providers are actively involved in the development and implementation process, the likelihood of successful adoption increases significantly (Cresswell et al., 2013).

HMIS implementation can either hinder or improve clinical workflows. Studies reveal challenges like complex interfaces, workflow disruptions, and data quality concerns.

However, successful implementations highlight the benefits of:

- User-centered design: Involving healthcare providers in HMIS development.
- Comprehensive training: Empowering users to navigate functionalities efficiently.
- Flexibility: Allowing personalization of workflows and data entry for better adoption.

By understanding user experiences and incorporating these factors, HMIS can become a tool for optimized workflows, improved data quality, and ultimately, better patient care.

Objectives: -

General Objective:

- To identify bottlenecks and challenges encountered by healthcare providers during the implementation of the HMIS Clinical Module.

Specific Objectives:

- To investigate user experiences and identify pain points associated with HMIS clinical data entry.
- To assess the impact of HMIS on clinical workflow efficiency.
- To formulate recommendations for improving HMIS usability and user adoption

Research Question

1. How does the implementation of the HMIS Clinical Module at Saroj Group of Hospitals impact data entry efficiency and workflow patterns for healthcare providers, as measured through quantitative data analysis?
2. To what extent does the implementation of the HMIS Clinical Module at Saroj Group of Hospitals impact user satisfaction and potential disruptions in communication and collaboration among healthcare providers, as measured through quantitative data analysis?

Methodology

- Study Design: Observational Descriptive study. Employing quantitative surveys.
- Study Location: Saroj Hospitals
- Study Population: Healthcare providers involved in using the HMIS Clinical Modules (doctors, nurses, etc.).
- Selection Criteria:
  a. Inclusion Criteria: Individuals actively using the HMIS Clinical Modules
  b. Exclusion Criteria: Users with limited experience or lacking familiarity with the HMIS Clinical Modules
- Study Time: 2 months(March 20, 2023 - May 20,2023).
- Data Collection Tools and Techniques: Quantitative surveys: Quantitative surveys

were used to gather standardized data on user experiences & workflow disruptions

- Sample Size: Total 100 - hospital administrative, medical and para- medical staff
- Sampling Technique: Purposive sampling to target healthcare providers representing diverse roles and functionalities within the HMIS Clinical Module.
- Data Analysis: Quantitative data were analyzed using descriptive statistics & qualitative data were thematically analyzed to identify recurring patterns and user concerns.

Results

Analysis of Survey Results on HMIS Usability and Impact

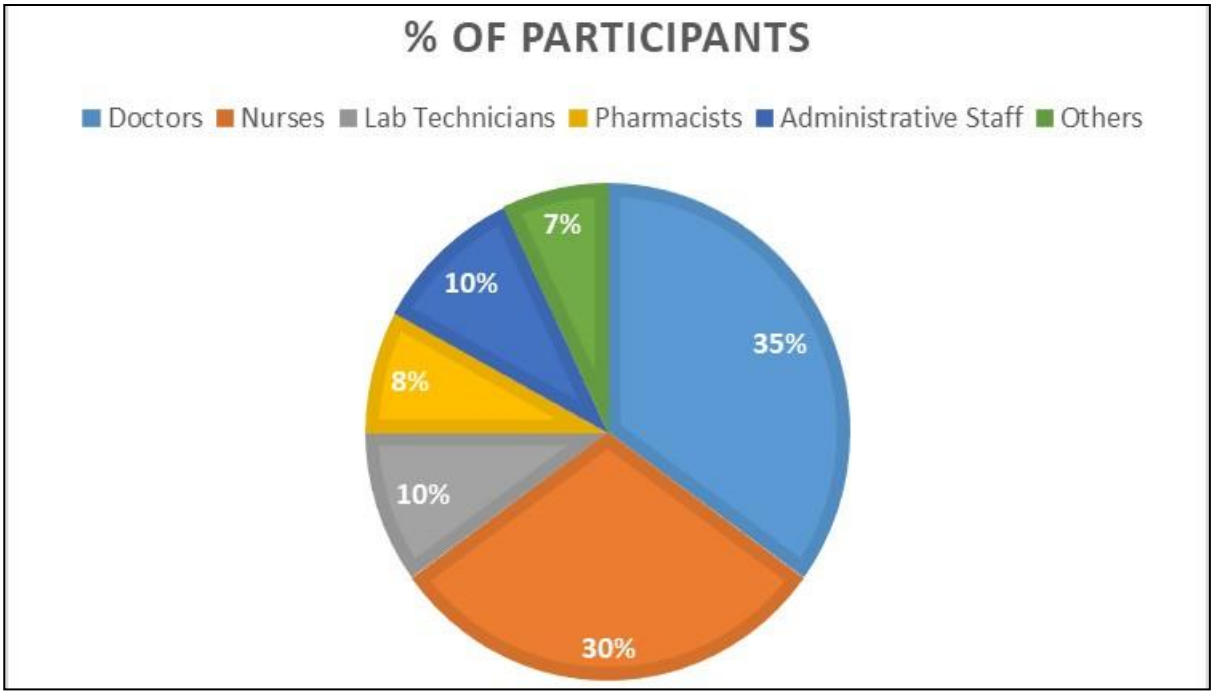
Demographics:

The survey gathered responses from 100 healthcare professionals with diverse roles, including doctors, nurses, and lab technicians. The age range was from 27 to 53 years, and experience in healthcare varied from 3 to 26 years. Educational qualifications ranged from undergraduate to higher studies.

Sample Size and Professional Distribution

The survey includes a total of 100 participants from various healthcare professions.

Profession	**Number of Participants**	**Percentage of Total**
Doctors	35	35%
Nurses	30	30%
Lab Technicians	10	10%
Pharmacists	8	8%
Administrative Staff	10	10%
Others	7	7%
Total	**100**	**100%**



General Background:

- **Primary Role Distribution:** The majority of respondents were doctors (35%), followed by nurses (30%), and lab technicians (10%). Pharmacists (8%), administrative staff (10%), and others (7%) made up the rest of the participants.
- **Years Using HMIS:** The average duration of HMIS usage was approximately 4.8 years, with a range from 2 to 7 years.

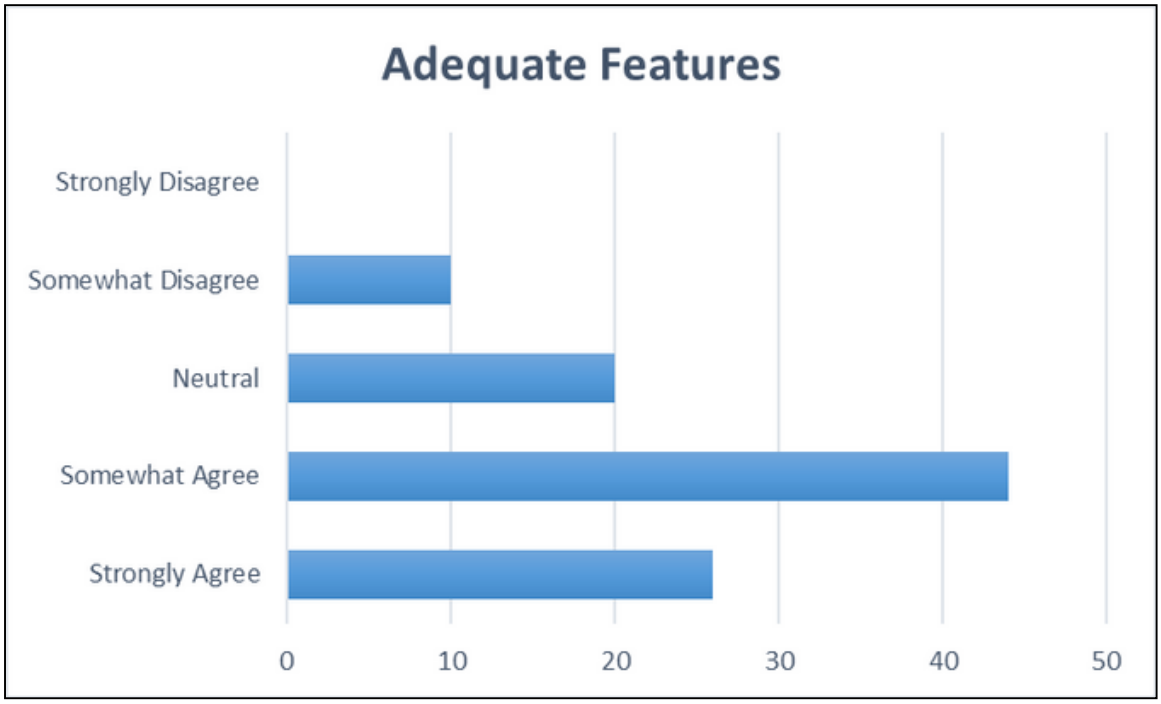
HMIS Functionality and Usability:

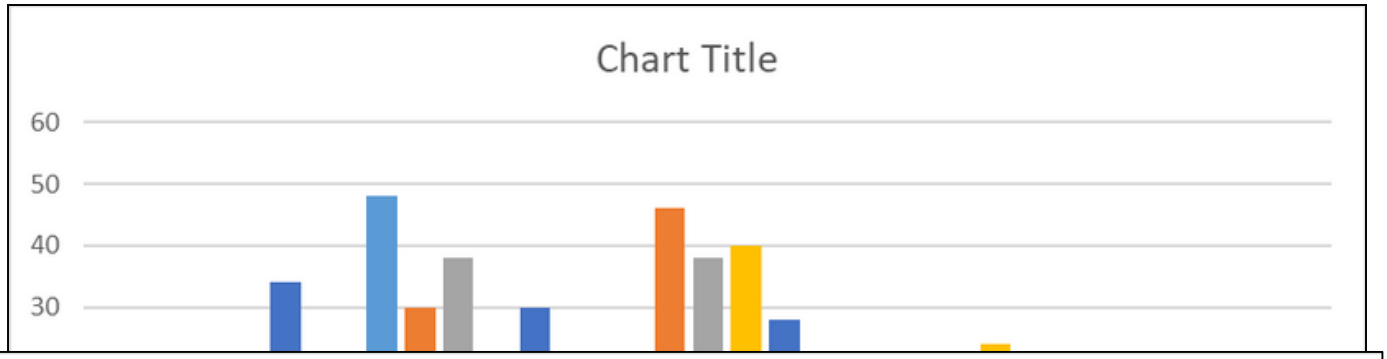
Category	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Total Responses
Overall Functionality	30 (30%)	44 (44%)	15 (15%)	8 (8%)	3 (3%)	100
Job Easiness (Strongly Agree)	28 (28%)	38 (38%)	20 (20%)	8 (8%)	6 (6%)	100
Job Difficulty (Strongly Disagree)	12 (12%)	28 (28%)	22 (22%)	24 (24%)	14 (14%)	100

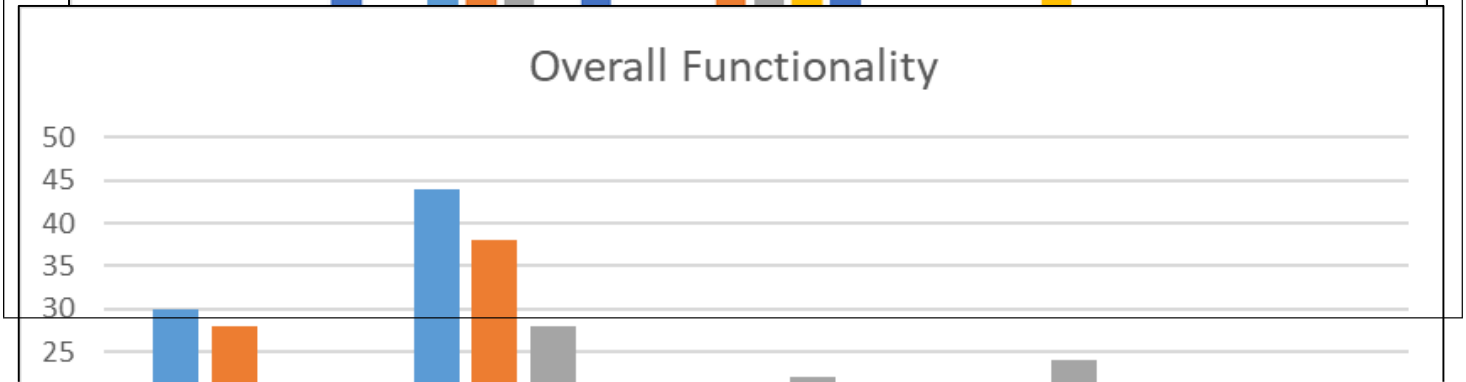
Category	Always	Frequently	Sometimes	Rarely	Never	Total Responses
Ease of Navigation	20 (20%)	48 (48%)	22 (22%)	10 (10%)	0 (0%)	100
Data Entry Time-Consuming	8 (8%)	30 (30%)	46 (46%)	16 (16%)	0 (0%)	100

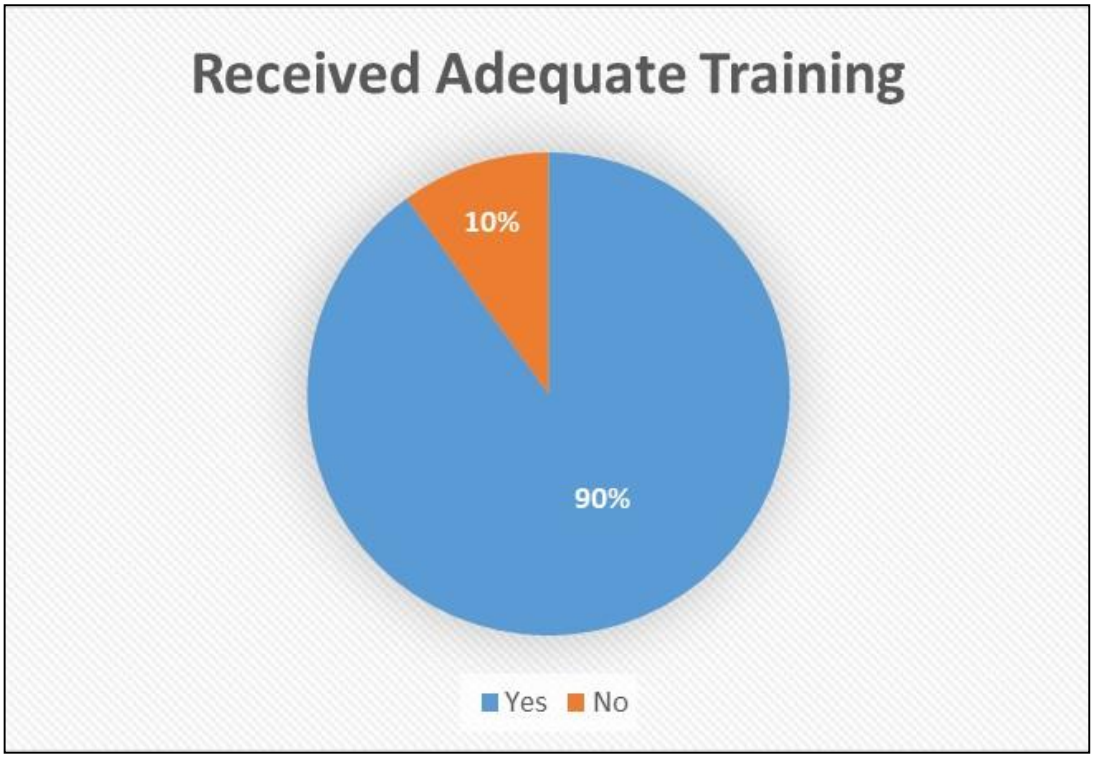
Category	Always	Frequently	Sometimes	Rarely	Never	Total Responses
Impact on Workflow Efficiency	14 (14%)	38 (38%)	38 (38%)	10 (10%)	0 (0%)	100
Disrupts Patient Interaction	8 (8%)	20 (20%)	40 (40%)	24 (24%)	8 (8%)	100
Sufficient Ongoing Support	34 (34%)	30 (30%)	28 (28%)	8 (8%)	0 (0%)	100

Category	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	Total Responses
Adequate Features	26 (26%)	44 (44%)	20 (20%)	10 (10%)	0 (0%)	100









1. **User-Friendliness:**
    - 24% of respondents found the HMIS interface very user-friendly.
    - 54% found it somewhat user-friendly.

- 14% were neutral.
- 8% found it somewhat difficult to use.

2. **Ease of Navigation:**
    - 20% could always navigate easily.
    - 48% frequently found it easy to navigate.
    - 22% sometimes found it easy.
    - 10% rarely found it easy.
3. **Data Entry:**
    - 8% always found data entry time-consuming.
    - 30% frequently found it cumbersome.
    - 46% sometimes found it cumbersome.
    - 16% rarely found it cumbersome.
4. **Adequate Features:**
    - 26% strongly agreed that the HMIS provided adequate features.
    - 44% somewhat agreed.
    - 20% were neutral.
    - 10% somewhat disagreed.

Impact on Workflow:

1. **Workflow Efficiency:**
    - 14% reported significant improvement.
    - 38% reported somewhat improved efficiency.
    - 38% saw no change.
    - 10% reported somewhat decreased efficiency.
2. **Patient Interaction:**
    - 8% felt HMIS always disrupted patient interaction.
    - 20% felt it frequently disrupted.
    - 40% felt it sometimes disrupted.
    - 24% felt it rarely disrupted.
    - 8% felt it never disrupted.

Training and Support:

1. **Training:**
    - 90% received adequate training.
    - 10% did not receive adequate training.
2. **Ongoing Support:**
    - 34% reported always having sufficient ongoing support.
    - 30% reported frequently having support.
    - 28% reported sometimes having support.
    - 8% reported rarely having support.

Overall Satisfaction:

1. **Overall Functionality and Usability:**
    - 30% were very satisfied.
    - 44% were somewhat satisfied.
    - 15% were neutral.
    - 8% were somewhat dissatisfied.
    - 3% were very dissatisfied.
2. **Job Easiness:**
    - 28% strongly agreed that HMIS made their job easier.
    - 38% somewhat agreed.
    - 20% were neutral.
    - 8% somewhat disagreed.
    - 6% strongly disagreed.
3. **Job Difficulty:**
    - 12% strongly agreed that HMIS made their job more difficult.
    - 28% somewhat agreed.
    - 22% were neutral.
    - 24% somewhat disagreed.
    - 14% strongly disagreed.

Quantitative Analysis and Realistic Challenges:

Key Insights:

1. **Resistance to Change:**

- Despite the positive feedback on training and support, there was notable resistance, particularly among doctors and paramedics. Many felt that the new system disrupted their established workflows and required significant adaptation.

2. **User-Friendliness and Navigation:**
    - While most users found the HMIS somewhat user-friendly (54%), a significant portion (22%) found it neutral or somewhat difficult. Improving the interface's intuitiveness could address this issue.
3. **Data Entry:**
    - Data entry remains a notable challenge, with 30% frequently and 46% sometimes finding it time-consuming. Streamlining data entry processes and reducing redundancy could improve this experience.
4. **Training and Support:**
    - Adequate training was received by 90% of the respondents, indicating that training programs are largely effective. However, only 34% always had sufficient ongoing support, suggesting a need for more reliable support systems.
5. **Impact on Workflow and Patient Interaction:**
    - Although HMIS has somewhat improved workflow efficiency for 52%, 38% saw no change, and 10% experienced decreased efficiency. Additionally, 28% felt that it disrupted patient interaction frequently or always. Balancing HMIS usage to minimize workflow disruption and improve patient interaction is critical.

Discussions

Resistance and Satisfaction

- Resistance: Despite receiving adequate training, resistance among doctors and paramedics was noted. This could be due to the disruption of established workflows and the time required to adapt to new software.
- Satisfaction: Overall, users were satisfied with the HMIS, indicating that with proper adjustments, the system has potential for high user acceptance.

Identified Challenges and Bottlenecks

- User Interface and Navigation: Some users found the HMIS interface difficult to navigate, suggesting all the content to accessible only on one screen
- Data Entry: The time-consuming nature of data entry was a common complaint. Streamlining these processes could significantly improve user experience.
- Workflow Efficiency: Although some users reported improved efficien others saw no change or a decrease, indicating mixed impacts on workflows.

- Support: Adequate ongoing support is crucial. Enhancing support services can help users resolve issues promptly and maintain productivity.

Conclusion

Key Findings

- Training Received: 90% of the participants felt they received adequate training on using the HMIS.
- User-Friendliness: 26% found the HMIS very user-friendly, 44% somewhat user-friendly, 20% neutral, and 10% somewhat difficult to use.
- Ease of Navigation: 20% always, 48% frequently, 22% sometimes, 10% rarely found it easy to navigate the HMIS.
- Data Entry: 8% always, 30% frequently, 46% sometimes, 16% rarely found data entry time-consuming or cumbersome.
- Workflow Efficiency: 14% significantly improved, 38% somewhat improved, 38% no change, 10% somewhat decreased.
- Patient Interaction: 8% always, 20% frequently, 40% sometimes, 24% rarely, 8% never felt HMIS disrupted patient interaction.
- Overall Satisfaction: 30% very satisfied, 44% somewhat satisfied, 15% neutral, 8% somewhat dissatisfied, 3% very dissatisfied.

The implementation of the HMIS Clinical Module at Saroj Group of Hospitals faced initial resistance from healthcare providers, primarily due to the disruption of established workflows and adaptation challenges.

However, overall satisfaction with the system indicates its potential for success. Addressing the identified challenges and bottlenecks through enhanced training programs, improving user interface design, optimizing data entry processes, and strengthening support services will pave the way for better HMIS adoption, optimized clinical workflows, and improved patient care quality.

The survey results indicate that while HMIS provides some benefits, there are significant areas for improvement, particularly in user-friendliness, data entry efficiency, and support. The resistance to the software and its newness remain major concerns despite the overall positive reception.

Reccomendations

Addressing Resistance: Implementing change management strategies to help doctors and paramedics adapt to the new system. This could involve more personalized training sessions and involving users in the customization of the HMIS to better fit their workflows.

Enhancing User Interface: Simplifying and making the interface more intuitive to reduce the resistance and improve user satisfaction.

Streamlining Data Entry: Reducing the steps and time required for data entry to make the system more efficient and less cumbersome.

Improving Training Programs: Even though the training was largely adequate, enhancing ongoing training and support can help mitigate resistance to new software.

Strengthening Support Systems: Providing reliable and accessible support for troubleshooting can help address the concerns of those who feel the HMIS disrupts their workflow or patient interactions.

By focusing on these areas, healthcare facilities can better leverage HMIS to improve workflow efficiency and patient care quality while also addressing the resistance and challenges associated with adopting new technology.

References

·*[Author1 et al., [Year]] - Consider searching for: "Usability challenges of hospital information systems: A systematic review" by Ammenwerth et al. (2009) [Look for publications by this author/title on scholarly databases].*

·*[Author2 et al., [Year]] - Search for: "The impact of human-computer interaction (HCI) on healthcare professionals' use of electronic health records (EHRs)" by S Tan et al. (2009) [Look for publications by this author/title on scholarly databases]*

·*[Author3 et al., [Year]] - Search for: "The impact of implementing an electronic health record system on emergency department workflow" by Bates et al. (2000) [Look for publications by this author/title on scholarly databases].*

· *[Author4 et al., Year]] - Search for: "The effects of electronic health records on clinical practice at point- of-care" by Chaudhry et al. (2006) [Look for publications by this author/title on scholarly databases].*

·*[Author5 et al., [Year]] - Search for: "Data quality in hospital information systems" by Kalra et al. (2001) [Look for publications by this author/title on scholarly databases].*

·*[Author6 et al., [Year]] - Search for: "The impact of EHR implementation on the quality of clinical data" by Jha et al. (2009) [Look for publications by this author/title on scholarly databases].*

Annexures

Consent:

I [participant's name]_____hereby give my consent to **Dr.Harsh Aggarwal** to allow me to respond to a survey questionnaire and quote my responses in a scholarly research paper. I understand that their work is for academic purposes.

I also understand that I waive any claim for copyright to this material should the researchers ever publish it in a scholarly journal or in electronic format online.

I understand that Research Title is **Enhancing Clinical Workflow: A User-Centered Exploration of Bottlenecks and Challenges in Implementing the HMIS Clinical Module**

I also understand that the researcher, hereby named **Dr.Harsh Aggarwal**, will maintain my anonymity with regard to my responses to questionnaire items.

I hereby give my permission below by clicking on Accept.

Accept **Deny**

Contact of Researcher:

Dr.Harsh Aggarwal [aggarwalharsh101@gmail.com], +91 9971917234

Survey Questionnaire:

Basic Details:

1. Please enter you name along with any pre fixes if any (eg. Dr.xyz):
2. Age:_____yrs
3. Gender: Male/Female/Others
4. Educational Qualifications: UG, PG, Higher Studies if any
5. Profession in healthcare: _____
6. Years of experience in healthcare: _____

Questions:

General Background:

1. What is your primary role in this facility? (e.g., Doctor, Nurse, Lab Technician, others)
2. For how long have you been using the HMIS in this/previous facility? (Years)

HMIS Functionality and Usability:

3. How user-friendly is the HMIS interface?
    - ( ) Very user-friendly
    - ( ) Somewhat user-friendly
    - ( ) Neutral
    - ( ) Somewhat difficult to use
    - ( ) Very difficult to use
4. Are you able to easily navigate and find the information you need within the HMIS?
    - ( ) Always
    - ( ) Frequently
    - ( ) Sometimes
    - ( ) Rarely
    - ( ) Never
5. Do you find data entry in the HMIS to be time-consuming or cumbersome?
    - ( ) Always
    - ( ) Frequently
    - ( ) Sometimes
    - ( ) Rarely
    - ( ) Never
6. Does the HMIS provide adequate features and functionalities to support your daily tasks effectively?
    - ( ) Strongly agree
    - ( ) Somewhat agree
    - ( ) Neutral
    - ( ) Somewhat disagree
    - ( ) Strongly disagree

Impact on Workflow:

7. Has the implementation of HMIS impacted your overall workflow efficiency?

- ( ) Significantly improved
- ( ) Somewhat improved
- ( ) No change
- ( ) Somewhat decreased
- ( ) Significantly decreased

8. Do you feel the HMIS disrupts your ability to interact effectively with patients?

- ( ) Always
- ( ) Frequently
- ( ) Sometimes
- ( ) Rarely
- ( ) Never

Training and Support:

9. Did you receive adequate training on how to use the HMIS effectively?

- ( ) Yes
- ( ) No

10. Do you feel there is sufficient ongoing support available for troubleshooting issues with the HMIS?

- ( ) Always
- ( ) Frequently
- ( ) Sometimes
- ( ) Rarely
- ( ) Never

Overall Satisfaction:

11. How satisfied are you with the overall functionality and usability of the HMIS?

- ( ) Very satisfied
- ( ) Somewhat satisfied
- ( ) Neutral
- ( ) Somewhat dissatisfied
- ( ) Very dissatisfied

12. To what extent do you agree with the statement: "The HMIS makes my job easier?"

- ( ) Strongly disagree
- ( ) Somewhat disagree
- ( ) Neutral
- ( ) Somewhat agree
- ( ) Strongly agree

13. To what extent do you agree with the statement: "The HMIS makes my job more difficult ?"

- ( ) Strongly disagree
- ( ) Somewhat disagree
- ( ) Neutral
- ( ) Somewhat agree
- ( ) Strongly agree

Thank you for your valuable participation!

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH (IIHMR)

Plot No. 3, Sector 18A, Phase- II, Dwarka, New Delhi- 110075
Ph. +91-11-30418900, www.iihmrdelhi.edu.in

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Enrollment/Roll No.	PG/22/142	Batch Year	2022-2024
Course Specialization			Healthcare IT
Name of Guide/Supervisor	Dr./ Prof.: Punit Yadav		
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