

TIME MOTION ANALYSIS IN CLINICAL PHARMACY: ENHANCING WORKFLOW EFFICIENCY AT MEDANTA HOSPITAL

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in

Hospital and Health Management

By

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Under the Supervision and Guidance of

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TO WHOMSOEVER IT MAY CONCERN

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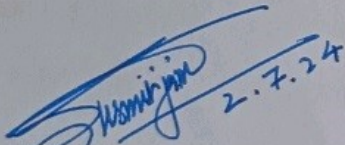


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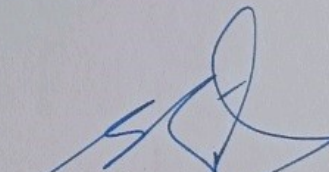
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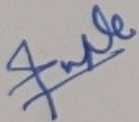
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DECLARATION BY STUDENT

I hereby declare that this dissertation titled TIME MOTION ANALYSIS IN CLINICAL PHARMACY :ENHANCING WORKFLOW EFFICIENCY AT MEDANTA HOSPITAL is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



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Dr. Simran De

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Time Motion Analysis in Clinical Pharmacy: Enhancing Workflow Efficiency at Medanta Hospital

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Keyword: clinical pharmacy, time motion analysis, workflow efficiency, medication administration, healthcare optimization

Background: Efficient clinical pharmacy operations are crucial for optimizing patient care and healthcare delivery. However, inefficiencies in workflow, particularly in medication administration processes, can hinder effective patient management and resource utilization.

Objective: This dissertation aims to conduct a meticulous time motion analysis within the clinical pharmacy department at Medanta Hospital to identify workflow inefficiencies related to medication administration. The primary objective is to propose evidence-based recommendations for enhancing workflow efficiency and healthcare service delivery.

Methodology: There are different methods used in this research such as prospective observational design. There is a mix of quantitative time motion analysis and qualitative insights that involved interviews and observations. The strategies included designing observation checklists and questionnaires while observing ethical principles of participant confidentiality. Key performance indicators include pharmacy activities' duration, interruptions count and communication breakdowns. This was done at the Clinical Pharmacy department of Medanta Hospital, which is a one-stop multi-specialty hospital situated in Gurugram, India. A study population of 124 patients on the inpatient wards (IPD) with the use of purposive sampling at Medanta Hospital who have had either urgent or new medication orders from March 14th to June 18th, 2024.

Results: Findings of the time motion analysis indicate undue allocation of time towards drug preparation and documentation leading to delays in drug administration. Causes were found to be communication barriers, staffing shortages, as well as technological barriers. Comparative analyses with literature highlight global trends and best practices in clinical pharmacy management.

Conclusions: The research underscores the importance of introducing some interventions aimed at streamlining clinical pharmacy workflows in Medanta Hospital. Evidence-based suggestions include developing staff competencies through workforce development, installing automated dispensing systems to facilitate efficient medication preparation and encouraging interdisciplinary collaboration that enhances communication and coordination. These moves will change the face of healthcare; they will be focused on excellent patient care and operational efficiency.

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List of Abbreviations

- **MAR:** Medication Administration Record
- **GDA:** General Duty Assistant
- **CP:** Clinical Pharmacist
- **ICU:** Intensive Care Unit
- **NABH:** National Accreditation Board for Hospitals
- **NABL:** National Accreditation Board for Testing and Calibration Laboratories
- **JCI:** Joint Commission International
- **EMR:** Electronic Medical Record
- **CPOE:** Computerized Provider-based Order Entry

Chapter 1: Introduction

Clinical Pharmacy Department

The Clinical Pharmacy Department at Medanta Hospital plays an important role in patient care. It focuses on ensuring safe and effective use of medications, providing medication treatment plans, and collaborating with other health care providers to improve patient outcomes. The department has trained pharmacists well in the hospital where they are the core of the healthcare team. Clinical pharmacy is a dynamic and important profession in healthcare, dedicated to improving the quality of drug therapy and improving patient outcomes. Unlike traditional medicine, which tends to focus on drug distribution and combination, clinical medicine emphasizes direct patient care and medication management to ensure delivery emphasize the efficient and effective use of medicines.

Scope:-

- Patients to review.
- Reporting of errors
- Emr audit checklist updating.
- Medication administration audits.
- Random pill count
- Adverse drug reaction reporting and monitoring

Working of the Clinical Pharmacy Department:-

1. Medication Review and Reconciliation:

Hospital pharmacists closely review patient medications upon admission, admission and discharge to ensure continuity of care and prevent medication

errors. They ensure that prescriptions are verified and reconciled to the patient's medical condition

2. Patient Counselling and Education:

Physicians counsel patients and their families regarding medication use, side effects, and control strategies. Patients are educated on the importance of adherence to prescribed medications.

3. Medication Therapy Management (MTM):

Physicians evaluate the appropriateness, effectiveness, and safety of medications. Recommendations for drug switching, discontinuation, or modification are recommended to physicians.

4. Clinical Interventions and inventory management:

Identify and address drug-related issues, including drug interactions, adverse drug reactions, and routine duplication of treatments. Physicians engage in a variety of processes evaluating patient cases and recommending drug therapy.

5. Preparation and Dispensing:

The department ensures accurate formulation and dispensing of drugs, including intravenous mixtures and therapeutic drugs. Pharmacists check compounding and ensure compliance with safety and quality standards.

6. Research and Education:

Clinical pharmacists participate in research activities to advance clinical pharmacology and improve patient care practices. Education and training is provided to medical students, residents, and other healthcare professionals.

Clinical pharmacists engage in research activities to advance the field of clinical pharmacy and improve patient care practices. They provide education and training to pharmacy students, residents, and other healthcare professionals.

Qualifications of Clinical Pharmacists

1. Educational Qualifications:

A bachelor of pharmacy degree (PharmD) from an accredited institution is usually required. Completion of a pharmacy residency program (PGY1) is generally preferred, with some positions requiring a PGY2 residency in a specialty area.

2. Licenses and Certifications:

Clinical physicians must be properly licensed to practice medicine in their state or country. Board certification in a clinical pharmacy specialty area, such as Board Certified

Pharmacotherapy Specialist (BCPS) or Board Certified Oncology Pharmacist (BCOP) is often beneficial.

3. Continuing Education: Physicians are required to participate in continuing education (CE) programs to maintain their licensure and continue to advance in the profession.

Job Role of Clinical Pharmacists

1. **Direct Patient Care:** Assess patients' health problems and medication needs. Develop and implement drug treatment plans to address identified problems.
2. **Interdisciplinary Collaboration:** Collaborate with physicians, nurses, and other healthcare professionals to develop and implement patient care strategies. Participate in clinics and impart knowledge about drugs.
3. **Medication Safety and Quality Assurance:** Patient response to drugs should be monitored and treatment adjusted as necessary to achieve optimal results. Ensure compliance with hospital policy, regulatory requirements and best practice guidelines.
4. **Education and Training:** Educate patients and caregivers about medication use and disease management. Mentor and advise medical students, interns and residents.
5. **Research and Professional Development:** Conduct and participate in clinical research studies. Document research findings and present them at professional meetings.
6. **Administrative Responsibilities:** Develop and update clinical guidelines and policies. Participate in pharmacy and therapeutics (P&T) committee meetings to review and monitor clinical formulations.

The Department of Clinical Pharmacy at Medanta Hospital is dedicated to improving patient care through medication efficiency, patient education and collaborative health practices. Hospital physicians in this department are highly trained professionals to ensure safe and effective use of medicines, contributing significantly to the overall quality of health care delivery.

1.1 Purpose of the Research:

The main objective of this study was to conduct a comprehensive time course study in the Department of Clinical Pharmacy at Medanta Hospital. By analysing clinical pharmacists' workload and time management, this study aims to identify inefficiencies and delays in medication dispensing. The primary objectives are to increase the

operational efficiency of the hospital pharmacy department, improve patient care outcomes, and provide practice recommendations for scheduling efficiency

1.2 Research Problem:- .

Clinical pharmacists are an integral part of the healthcare team, responsible for ensuring the safe and effective use of medicines. However, complicated regimens, high patient volumes, communication barriers, and other challenges often lead to inefficient and delayed medication delivery. This delay can affect patient outcomes badly, increase the risk of medication errors, and increase satisfaction with health services for all.

Despite the important role of clinical pharmacists, there is a paucity of research that focuses specifically on analysing their work processes and time management in real-world settings. Understanding these developments is important in order to develop strategies that can reduce delays and improve clinical pharmacy services.

1.3 Context:-

Medanta Hospital, a leading multi-centre medical facility located in Gurugram, India, is known for its advanced pharmacy facilities and superior patient care. Medanta's clinical pharmacy department plays an important role in the management of medicines and patients in security. But like many other healthcare organizations, Medanta faces challenges in maintaining best practices in its medical and pharmacy operations.

The importance of addressing these challenges cannot be overstated. Efficiency in clinical pharmacy ensures timely dispensing of medications, reduces the chance of error, and enhances the overall patient care experience in addition to optimizing resource utilization through clinical pharmacy workflow smooth running, low operating costs, more -Can also have employee satisfaction.

Given the critical role of clinical medicine in patient care and improving operational efficiency, this study is critical. It aims to provide insights that can help Medanta hospitals and other such organizations—for them hospital medicine services have been good, will eventually be good. contributes to the delivery of health care.

1.4 Aims and Objectives of the Study

1.4.1 Aim

This study aims to increase the efficiency and effectiveness of the Hospital Pharmacy Department at Medanta Hospital by identifying and addressing inefficiencies and delays in processing.

1.4.2 Objectives

To achieve this aim, the study has set the following specific objectives:

1. Analyse the Workflow and Time Management of Clinical Pharmacists:

- Conduct a detailed time motion analysis to understand how clinical pharmacists allocate their time to various tasks.
- Identify the most time-consuming activities and potential bottlenecks in the workflow

2. Identify Challenges and Reasons for Delays:

- Identify the main challenges that clinical physicians face in their daily operations.
- Investigate reasons for drug delays, including internal and external factors.

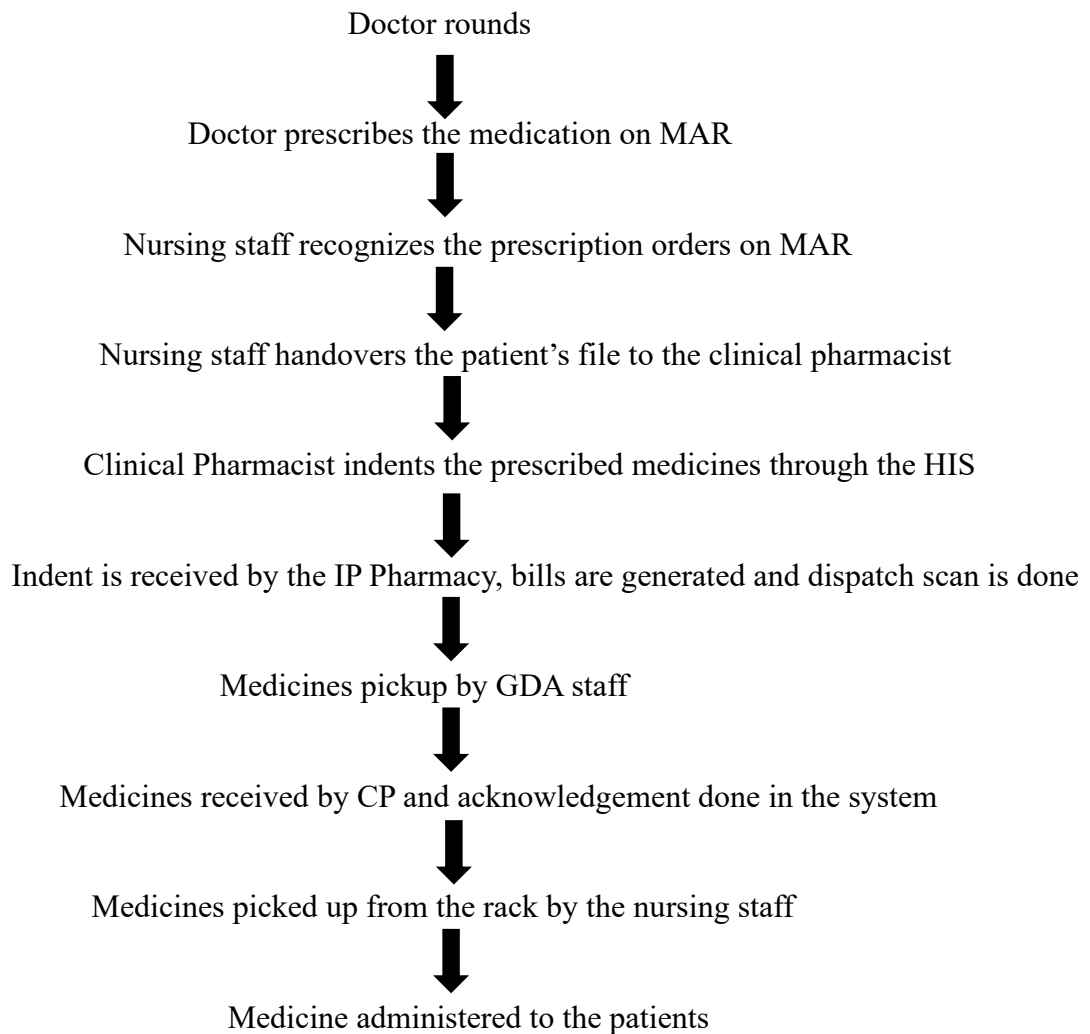
3. Provide Recommendations for Improvement:

- Formulate recommendations that can be implemented to improve the workflow based on findings.
- Suggest ways to address identified challenges and reduce delays in the supply of medicines.

4. Enhance Patient Care and Safety:

- Implement changes to improve hospital pharmacy services, which improve patient care outcomes and ensure medication safety.
- Evaluate the impact of these changes on the overall performance of the hospital pharmacy department.

Workflow of Clinical Pharmacy



Chapter 2

Literature Review

Authors(Year)	Study Location	Sample Size	Sampling Techniques	Salient Features
Poudel et al. (2024)	Nepal	80 pharmacists	Random Sampling	Studied the barriers to effective clinical pharmacy practice in developing countries. The study highlighted issues related to training and resource limitations as major challenges. The researchers emphasized the need for better training programs, adequate resources, and supportive policies to enhance clinical pharmacy practice in developing countries.
Rios et al. (2023)	Brazil	150 pharmacists	Purposive Sampling	Examined the use of mobile health technologies in clinical pharmacy. Reported improved workflow efficiency and patient care. The study reported improved workflow efficiency and patient care due to the use of mobile health technologies. The researchers highlighted the potential of these technologies to streamline

				communication, enhance medication management, and improve patient outcomes.
Marzolini et al. (2022)	Switzerland	75 pharmacists	Convenience sampling	Investigated the impact of COVID-19 on clinical pharmacy operations. Identified increased workload and stress as major challenges. he study identified increased workload and stress as major challenges during the pandemic. The researchers emphasized the importance of continuous professional development and ongoing education to keep pharmacists updated with the latest clinical practices and technologies.
Houliind et al. (2021)	Denmark	300 patients	Stratified Random Sampling	Focused on the efficiency of clinical pharmacy services in hospitals. Highlighted the role of multidisciplinary teams in reducing delays. The involvement of various healthcare professionals in the medication administration process was found to be beneficial in managing complex cases and ensuring timely delivery of medications.
Al-Jumaili et al. (2020)	Saudi Arabia	60 pharmacists	Cluster sampling	Analysed workflow efficiency post-implementation of

				automated dispensing systems. Found reduction in medication errors and delays. The researchers highlighted the importance of investing in modern pharmacy management systems and providing adequate IT support to ensure smooth operations.
Bond et al. (2019)	United States	500 patients	Systematic Sampling	Evaluated the impact of pharmacist interventions on patient outcomes. The study found significant improvements in patient satisfaction and safety due to pharmacist interventions. Effective communication and adequate staffing levels were crucial for reducing delays and ensuring smooth operations. The researchers recommended regular training for healthcare providers on communication skills and team coordination.
Poon et al. (2018)	Hong Kong	200 patients	Purposive Sampling	Studied the causes of medication administration delays. Identified communication barriers between healthcare providers—particularly between pharmacists and nurses—as a key issue. Unclear medication orders, difficulties in contacting

				prescribers for clarification, and a lack of standardized communication protocols were prevalent. The study suggested implementing electronic prescribing systems and standardized communication tools to mitigate these barriers.
Pedersen et al. (2016)	Australia	100 pharmacies	Random Sampling	Assessed the time allocation of clinical pharmacists. Found dispensing and documentation as major time-consuming activities. The study highlighted the critical role of medication preparation in overall workflow efficiency and recommended adopting automated dispensing systems and better workflow management to address these inefficiencies.
Elenbaas et al. (2014)	Canada	50 pharmacists	Convenience Sampling	Investigated the role of clinical pharmacists in medication safety. Highlighted the importance of pharmacist intervention.
Henderson et al. (2012)	United States	30 Hospitals	Stratified Random Sampling	Analysed the impact of EHRs on clinical pharmacy workflow. Noted significant time savings with EHR implementation. The study found significant time savings with EHR implementation,

				suggesting that EHRs can help reduce the workload on clinical pharmacists by streamlining documentation and communication processes.
Seston et al. (2009)	United Kingdom	45 pharmacists	Purposive Sampling	Examined the workload and stress levels of clinical pharmacists. Found high workload linked to increased stress. Pharmacists reported higher levels of burnout and a greater likelihood of making medication errors in understaffed settings. The study recommended improving staffing levels and implementing better workload management strategies to enhance the efficiency and well-being of clinical pharmacists.

Chapter 3: Methodology

3.1 Key Research Questions

The primary research questions guiding this study are:

1. What are the main workflow inefficiencies and delays in the clinical pharmacy department at Medanta Hospital?
2. What are the primary causes of these delays?
3. How can the identified inefficiencies be addressed to improve the overall efficiency and effectiveness of the clinical pharmacy department?

3.2 Research Design

This study employs a prospective observational research design. A prospective study is chosen to allow for real-time observation and analysis of clinical pharmacy processes. This design is appropriate for identifying workflow patterns, delays, and inefficiencies as they occur.

3.3 Study Setting

The study has been conducted at the Department of Clinical Pharmacy, Medanta Hospital, a medical institution in Gurugram, India. Medanta Hospital is known for its advanced medical facilities and large number of patients, making it an ideal setting for this study.

3.4 Study Population

The study population consists of patients admitted to the inpatient departments (IPDs) of Medanta Hospital with scheduled orders for emergency or new medicines. The study also involves pharmacists working in these hospitals, because their performance and interactions are crucial in the drug delivery process.

3.4.1 Inclusion Criteria

- Patients admitted to the inpatient wards of Medanta Hospital.
- Patients prescribed urgent or new medication orders during the study period.
- Clinical pharmacists responsible for medication verification, preparation, and administration in the inpatient wards.

3.4.2 Exclusion Criteria

- Patients in outpatient departments (OPD) or those not prescribed urgent or new medications.
- Clinical pharmacists not involved in the inpatient wards during the study period.
- Patients with routine medication orders.
- Any patients or pharmacists unwilling to participate in the study.

3.5 Research Procedures

3.5.1 Quantitative Assessment

The quantitative assessment involves a time motion analysis of the clinical pharmacists' workflow. Specific time points, such as time of doctor rounds, time of medication prescription, time of nursing recognition, time of file handover to the clinical pharmacist, time of indentation, dispatch time scan, GDA pickup time, CP Receiving time, time of acknowledgement, nursing pickup time and time of administration are recorded to identify delays and inefficiencies.

Data Collection Procedure

- **Direct Observation:** Trained observers record the time taken for each step in the medication administration process.
- **Time Tracking Tools:** Use of electronic time tracking tools to ensure accurate recording of time intervals.

3.5.2 Qualitative Assessment

The qualitative assessment involves semi-structured interviews with clinical pharmacists to gain insights into the challenges they face and the reasons for delays in the medication administration process.

Data Collection Procedure

- **Interviews:** Conducted with clinical pharmacists to explore their experiences, challenges, and suggestions for improvement.
- **Focus Groups:** Group discussions with pharmacists to identify common issues and potential solutions.

3.6 Sample Size Calculation

The sample size is calculated based on the expected number of medication orders and the number of clinical pharmacists available during the study period. Assuming an average of 5 urgent or new medication orders per day and a study duration of 30 days, the estimated sample size is 120 medication orders. Additionally, 2 clinical pharmacists working in the inpatient wards will be included.

3.7 Sampling Techniques

- Purposive sampling, also known as significance sampling, includes non-probability sampling methods in which units are selected based on specific characteristics needed for sampling. This approach relies on researcher discretion to select individuals, cases, or events that may best contribute to study objectives. Purposive sampling finds common use in qualitative and mixed-methods research, is particularly useful when analysing information-rich content or optimizing with limited resources. However, it is susceptible to bias such as audience bias.
- Patients who prescribed stat or new medication orders were selected to ensure that the sample matched the objectives of the study.

3.8 Study Instruments

- **Observation Checklists:** To systematically record the time taken for each step in the drug administration process..
- **Interview Guides:** To ensure consistency of qualitative data collection across interviews and focus groups.
- **Time Tracking Devices:** Electronic devices for accurately measuring and recording time intervals.

3.9 Operational Definitions

- **Urgent Medication Orders:** Medication orders that require immediate patient care and immediate administration.
- **New Medication Orders:** The first prescription for a patient during their current hospital stay.
- **Time Motion Analysis:** A method of recording the time taken for each step in the process to identify inefficiencies and delays.

- **Adverse Drug Event (ADE):** An adverse drug event is a broad term that encompasses any side effect caused by a drug, including side effects and dose-related side effects incorrect or overdose results.
- **Medication Misadventure:** Medication Misadventure refers to any iatrogenic event or risk associated with drug use. This step includes medication errors, adverse drug reactions, and adverse drug events.
- **Sentinel Event:** According to The Joint Commission, a sentinel event is defined as an unexpected event involving death, serious physical or psychological injury, or risk. Acute injuries include loss of organ or function as well as any deviation from the procedure that, if repeated, could have serious adverse consequences.

3.10 Statistical Methods

Quantitative Data Analysis

- **Descriptive Statistics:** Mean, median, and standard deviation to summarize the time taken for each step in the drug administration process.

Qualitative Data Analysis

- **Thematic Analysis:** Coding and classifying interview and focus group data to identify common themes and insights related to business challenges and possible solutions.

3.11 Ethical Considerations

Informed Consent

- **Written Consent:** Obtained from all participants, including patients and clinical physicians, prior to the start of the study.
- **Voluntary Participation:** Participants are informed that their participation is voluntary and that they may withdraw at any time without consequence.

Data Security and Confidentiality

- **Data Security:** All data collected is securely stored with restricted access to ensure the privacy of the participants.
- **Anonymity:** All reports and publications identify participants anonymously to protect their confidentiality.

Chapter 4: Results

This chapter presents the results of a time series study in the Department of Clinical Pharmacy at Medanta Hospital. Results are presented as text, figures and tables, with case studies to convey key findings.

4.1 Overview of Data Collected

The study collected data from 124 medication orders and 2 clinical pharmacists over a 30-day period. The data includes time intervals for each step in the medication administration process, along with qualitative insights from interviews with clinical pharmacists.

4.2 Quantitative Results

4.2.1 Time Motion Analysis

Table 4.1: Time Taken for Each Step in Medication Administration Process (in minutes)

Step	Mean Time	Median time	Standard deviation
Doctor Rounds to Prescription Time on MAR	00:11:00	00	0.01
Prescription Time on MAR to Nursing Recognition Time	00:45:34	00:30:00	0.04
File Handover to CP for Indentation to Indenting Time	05:36:00	04:00:00	0
Indenting Time to Dispatch Scan Time from Pharmacy	00:22:51	00:21:00	0.01
Dispatch Scan Time to GDA Pickup Scan	00:16:00	00:16:00	0.01

GDA Pickup Scan to CP Receiving Acknowledgement	00:11:48	00:10:00	0.01
CP Receiving Acknowledgement to Medicine Pickup by Nurse	00:31:19	00:17:30	0.05
Medicine Pickup by Nurse to Time of Administration	1:37:37	0:25:00	0.12

Table 4.1: Average Time Spent on Each Step

Analysis

1. **Doctor Rounds to Prescription Time on MAR:** : This can indicate the efficiency of translating physician orders into actionable items.
 - **Mean Time:** 11 minutes
 - This step represents the initial phase where the doctor prescribes medication after rounds. It is relatively quick.
2. **Prescription Time on MAR to Nursing Recognition Time:**
 - **Mean Time:** 45 minutes and 34 seconds
 - This phase includes the time taken for the nurse to recognize the prescription after it has been entered into the Medication Administration Record (MAR). This is a crucial step that takes a significant amount of time.
3. **File Handover to CP for Indentation to Indenting Time:** The time taken for the clinical pharmacy to receive the file and process the indentation. This can identify delays in the internal workflow of the pharmacy department.
 - **Mean Time:** 5 minutes and 36 seconds

- It involves the handover of the prescription file to the Clinical Pharmacist (CP) for medication indenting.
4. **Indenting Time to Dispatch Scan Time from Pharmacy:** Evaluate the time taken to dispatch medications from the pharmacy once the indent is made. This step can reveal challenges in pharmacy preparation and delivery.
 - **Mean Time:** 22 minutes and 51 seconds
 - This step takes time from the time the product is injected until it is verified as being from the pharmacy. It is relatively effective.
 5. **Dispatch Scan Time to GDA Pickup Scan:** Measures the time taken by the General Duty Assistant (GDA) to pick up medication from the pharmacy. This difference may indicate inefficiency in logistics management.
 - **Mean Time:** 16 minutes
 - This phase includes the time taken by the general duty assistant (GDA) from the dispatch scan to the pickup scan. It means a smooth transition.
 6. **GDA Pickup Scan to CP Receiving Acknowledgement:** Assess the time taken for the medications to be received and acknowledged by the clinical pharmacy. This interval reflects the efficiency of the handover process.
 - **Mean Time:** 11 minutes and 48 seconds
 - This step involves the time taken from the GDA picking up the medication to the Clinical Pharmacist receiving and acknowledging it. It is quick and efficient.
 7. **CP Receiving Acknowledgement to Medicine Pickup by Nurse:** Calculate the time from when the clinical pharmacy acknowledges receipt to when the nurse picks up the medication. This interval can show delays in nurse responsiveness.
 - **Mean Time:** 31 minutes and 19 seconds
 - This step includes the time from the CP's acknowledgement to when the nurse picks up the medicine. This transition is relatively moderate.
 8. **Medicine Pickup by Nurse to Time of Administration:** Measure the final interval from when the nurse picks up the medication to when it is administered to the patient. This is crucial for understanding delays in actual medication administration.
 - **Mean Time:** 1 hour, 37 minutes, and 37 seconds

- This final step, from the nurse picking up the medicine to the actual administration of the medication to the patient, is the longest phase after the CP indentation process.

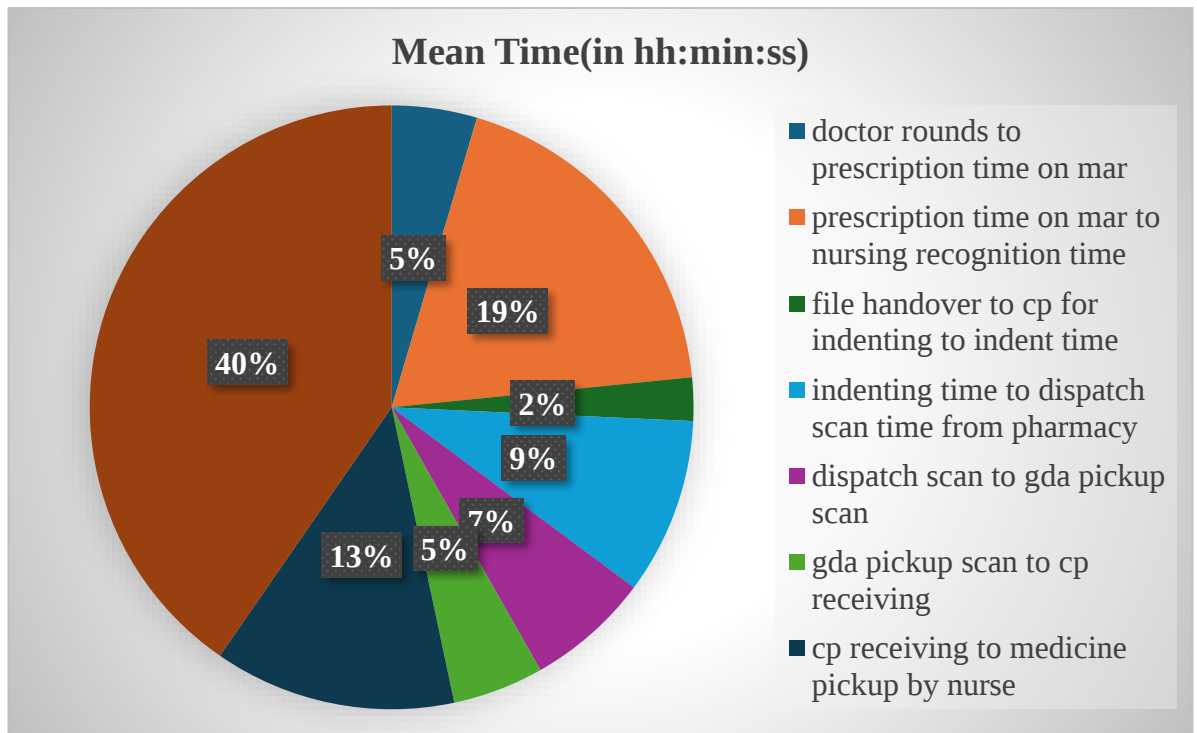


Figure 4.1: Mean Time spent on each activity

Interpretations and Recommendations

- **Key Bottleneck Identified:** The segment “Medicine Pickup by Nurse to Time of Administration” is the largest, indicating significant delays in the final step of the medication process. This suggests that the administration phase is a critical area for intervention.
- **Communication and Coordination:** The segments covering “Prescription Time on MAR to Nursing Recognition Time” and “Indenting Time to Dispatch Scan Time from Pharmacy” show moderate time consumption, indicating potential delays in communication and coordination. Improving electronic communication systems or protocols could help.
- **Efficiency in Handover Processes:** The segments for “File Handover to CP for Indenting to Indent Time,” “GDA Pickup Scan to CP Receiving,” and “CP Receiving to Medicine Pickup by Nurse” are relatively small, indicating that these handover processes are fairly efficient but could still benefit from fine-tuning.

Recommendations for Improvement

1. Streamline Medication Administration:

- Implementing better scheduling and reminders for nurses to administer medications on time.
- Using technology such as automated reminders or alerts to ensure timely medication administration.

2. Enhance Communication Systems:

- Utilizing electronic health records (EHRs) more effectively to reduce the recognition time by nursing staff.
- Implementing standardized communication protocols between clinical pharmacists and nurses.

3. Optimize Handover Processes:

- Continuously monitor and evaluate the handover processes to identify any potential inefficiencies.
- Provide training and resources to ensure smooth transitions between each stage of the medication process.

4. Address Nursing Workload:

- Assess the nursing staff's workload and consider redistributing tasks or hiring additional staff to ensure timely medication administration.
- Implement measures to reduce non-clinical duties for nurses, allowing them to focus more on patient care and medication administration.

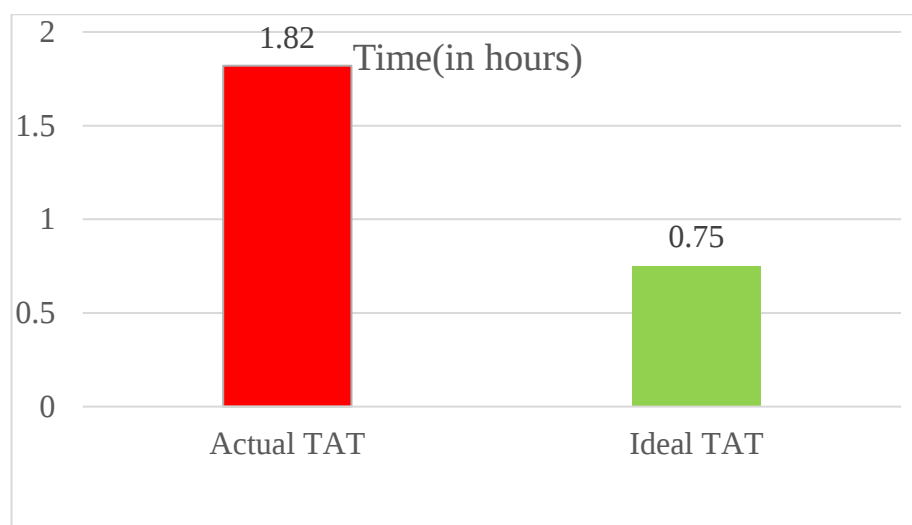


Figure 4.2: Comparison of ideal tat and actual tat

Analysis and Interpretations of the Bar Graph

The bar graph compares the Actual Turnaround Time (TAT) with the Ideal Turnaround Time (TAT) in hours. The Actual TAT is represented in red, and the Ideal TAT is represented in green.

Key Observations:

1. Actual Turnaround Time (TAT):

- The Actual TAT is 1.82 hours.
- This represents the current average time taken to complete the medication administration process.

2. Ideal Turnaround Time (TAT):

- The Ideal TAT is 0.75 hours.
- This represents the target or desired average time for completing the medication administration process.

Analysis:

• Discrepancy Between Actual and Ideal TAT:

- The Actual TAT is significantly higher than the Ideal TAT.
- There is a gap of 1.07 hours between the Actual and Ideal TAT, indicating a substantial difference.

• Efficiency Implications:

- The higher Actual TAT suggests inefficiencies in the current medication administration process.
- This discrepancy points to potential delays and bottlenecks that need to be addressed to achieve the Ideal TAT.

Interpretations:

1. Need for Process Improvement:

- The important difference between real and ideal TAT emphasizes the need for optimization.
- Streamlining the workflow and addressing identified problems can help reduce the actual TAT close to the optimal TAT.

2. Impact on Patient Care:

- Long turnaround times can negatively impact patient care, delaying medication delivery.

- Reducing TAT can improve patient outcomes by ensuring timely administration of medications.

3. Resource Utilization:

- Inefficiencies reflected in high actual TAT may indicate poor resource utilization.
- Process efficiencies can lead to better resource utilization, reduced operating costs, and improved employee satisfaction.

Recommendations:

1. Technology Integration:

- Implement electronic health records (EHRs) and automated delivery systems to streamline processes and CPOE for streamlining operations.
- Utilize mobile health technologies to enhance communication and coordination among healthcare providers.

2. Staff Training and Allocation:

- Provide continuous training for staff to improve efficiency and reduce errors.
- Ensure adequate staffing levels to manage high patient volumes without compromising on service quality.

3. Process Optimization:

- Redesign workflow processes to eliminate unnecessary steps and reduce waiting times.
- Establish clear protocols and standardized procedures to enhance consistency and reduce turnaround times.

4.3 Qualitative Results

4.3.1 Themes from Interviews with Clinical Pharmacists

On average, how many hours do you spend on direct patient care activities per shift?

6 responses

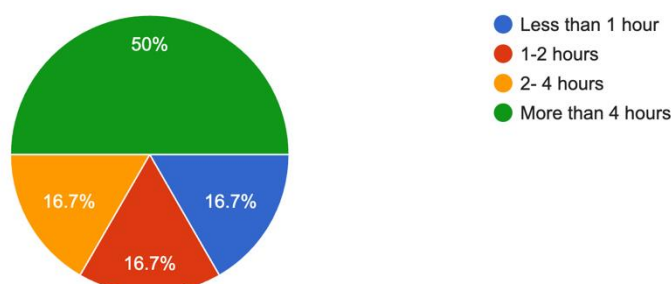


Figure 4.3- Duration of patient care activities per shift

How do you prioritise your tasks when faced with multiple demands on your time?

6 responses

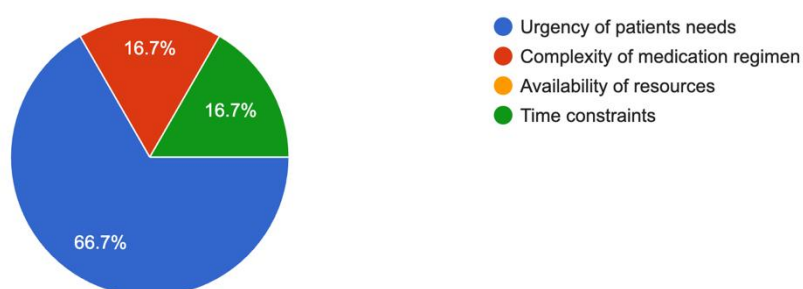


Figure 4.4- Prioritization of tasks

4.3.2

What challenges do you encounter your daily workflow ?

6 responses

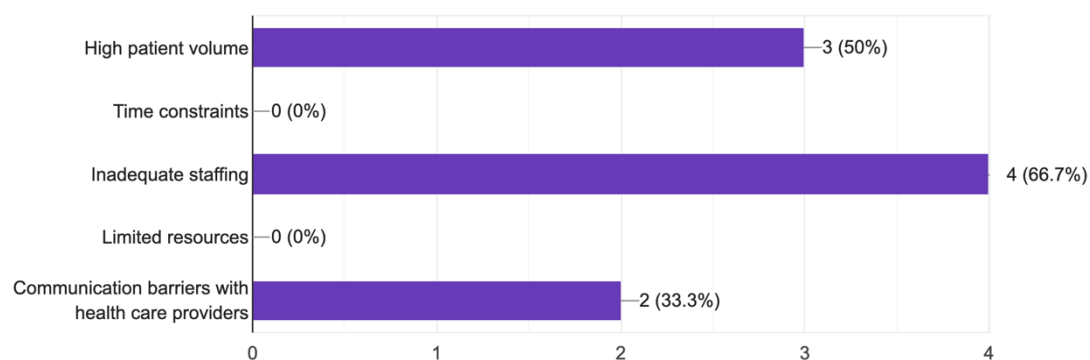


Figure 4.5: Major challenges faced by clinical pharmacists

Major Challenges	Percentage
High patient volume	50
Time constraints	0
Inadequate staffing	66.7
Limited resources	0
Communication barriers with healthcare providers	33.3

Table 4.2: Major challenges as per questionnaire:-

Analysis

Bottlenecks

1. Inadequate Staffing (66.7%):

- The most significant challenge reported, with 66.7% (4 out of 6) of respondents indicating inadequate staffing as a major issue.

2. High Patient Volume (50%):

- Half of the respondents (3 out of 6) cite high patient volume as a challenge in their daily workflow.

3. Communication Barriers with Health Care Providers (33.3%):

- A third of the respondents (2 out of 6) face challenges related to communication barriers with other healthcare providers.

4. Time Constraints and Limited Resources (0%):

- Interestingly, none of the respondents identified time constraints or limited resources as challenges, suggesting these are not primary issues in their workflow.

Suggestions for Improvement

1. Address Inadequate Staffing:

- **Increase Hiring:** Consider hiring additional staff to meet the demands of the patient load. This could involve full-time, part-time, or temporary staff depending on the need.
- **Optimize Scheduling:** Implement more efficient scheduling practices to ensure optimal coverage during peak times.
- **Leverage Technology:** Utilize technology solutions like electronic health records (EHR) and automated administrative systems to reduce the workload on current staff.

2. Manage High Patient Volume:

- **Streamline Processes:** Review and streamline patient intake and discharge processes to handle high volumes more efficiently.
- **Triage System:** Implement a robust triage system to prioritize patients based on urgency, ensuring those with the most critical needs are attended to promptly.
- **Patient Education:** Educate patients on off-peak hours and alternative care options (like telemedicine) to spread out the demand more evenly.

3. Improve Communication with Healthcare Providers:

- **Communication Training:** Provide training programs focused on effective communication techniques for healthcare providers.
- **Standardize Protocols:** Establish and enforce standardized communication protocols to ensure clarity and consistency in information sharing.
- **Collaborative Tools:** Utilize collaborative tools and platforms that facilitate better communication among healthcare teams, such as secure messaging apps or integrated communication systems within the EMR.

4. Maintain Focus on Time Management and Resource Allocation:

- While these were not identified as current issues, continued vigilance in maintaining effective time management practices and resource allocation is essential to prevent them from becoming bottlenecks in the future.

Table 4.3: Summary of Themes from Qualitative Data

Theme	Description
Communication Challenges	Pharmacists frequently cited issues with communication, particularly with doctors and nurses, as a major source of delays and inefficiencies.
Staffing Workload	Many pharmacists reported feeling overworked due to inadequate staffing levels, especially during peak hours.
Technological Constraints	Many pharmacists reported feeling overworked due to inadequate staffing levels, especially during peak hours.
Training and Professional Development	A need for continuous training and development opportunities was emphasized to keep up with evolving clinical practices.

▪ **Additional comments and recommendations from the staff:-**

- Additional quality staffs.
- Timely update of medicines and proper mapping of P1 items to avoid delay in intending.
- Counselling doctors to prescribe formulary drugs (at least nutritional supplements)
- To update formulary as per doctor's preferences.

4.3.2 Direct Quotes from Participants

- "Sometimes, it's just hard to get hold of a doctor when you need clarification on a prescription. This can cause significant delays."
- "During peak hours, we are understaffed, which increases our workload and slows down the entire process."
- "The pharmacy management software we use is outdated and often crashes, causing further delays."
- "There's always room for improvement in terms of training, especially with new medications and protocols."

Chapter 5: Discussion

5.1 Interpretation of Results

The primary objective of this study was to identify and analyse workflow inefficiencies and delays in the clinical pharmacy department at Medanta Hospital. The results indicate several critical areas that contribute to these inefficiencies, including medication preparation, communication barriers, staffing issues, and technological constraints. This chapter discusses these findings in the context of existing literature, highlighting similarities and differences with other studies, and examines the implications of these results.

5.1.1 Prescription Time on MAR to Nursing Recognition Time," which has a mean time of 45 minutes and 34 seconds, involves examining several potential issues that could cause delays. Here are some common bottlenecks that might be contributing to this extended time:

1. Communication Barriers

- **Lack of Efficient Communication Channels:** Delays in notifying nurses about new prescriptions due to ineffective communication systems.
- **Delayed Relay of Information:** Information about new prescriptions not being promptly relayed to the nursing staff.

2. Documentation Issues

- **Incomplete or Inaccurate Documentation:** Errors or omissions in the prescription details that require clarification before the nurse can recognize and act on them.
- **Time-Consuming Documentation Practices:** Manual documentation processes that are slow and prone to delays.

3. Technology-Related Delays

- **System Downtime:** Periods when the EHR system is not operational, causing significant delays.

4. Nurse Workload

- **High Workload:** Nurses being occupied with other tasks and not having immediate availability to check and recognize new prescriptions.
- **Understaffing:** Insufficient nursing staff leading to delays in recognizing new prescriptions due to high patient-to-nurse ratios.

5. Prioritization Issues

- **Non-Prioritized Recognition:** New prescriptions not being prioritized appropriately, leading to delays in recognition and subsequent actions.
- **Interruptions and Distractions:** Frequent interruptions and distractions during the shift causing delays in the recognition of new prescriptions.

6. Training and Awareness

- **Lack of Training:** Nurses not being adequately trained to use the MAR system efficiently, leading to delays in recognizing new prescriptions.
- **Awareness of New Prescriptions:** Nurses not being immediately aware of new prescriptions due to a lack of notification systems or protocols.

Strategies to Address Bottlenecks

1. Improving Communication Systems

- Implemented improved communication channels such as dedicated messaging systems to immediately alert nurses to new prescriptions.
- Implement integrated real-time information systems and EHRs to ensure rapid dissemination of information.

2. Streamlining Documentation Processes

- Transition to automated integrated document systems to reduce automated errors and speed up the documentation process.

- Regular audits and training to ensure accuracy and completeness of documentation.

3. Enhancing EHR Systems

- Updating EHR systems to reduce system downtime and ensure faster uptime.
- Provide ongoing support and maintenance to ensure the system is working properly.

4. Optimizing Nurse Workload

- Ensuring adequate staffing to ensure workload is handled efficiently and delays are minimised.
- Implement project planning to help prioritize and manage projects.

5. Prioritizing Prescription Recognition

- Establishing protocols to prioritize the recognition of new prescriptions.
- Minimizing interruptions and distractions by creating dedicated time slots for checking and recognizing prescriptions.

6. Training and Awareness Programs

- Regular training to ensure nurses are competent in using the MAR system and are aware of best practices.
- Implement awareness systems to ensure early adoption and response to new regulations.

5.1.2 Communication Barriers

Communication barriers were found to be the most common cause of delay. This result is in line with Poon et al. (2018), who found that communication issues between health care providers significantly hindered medication delivery. Advanced communication tools and systems are needed to reduce this delay and increase overall operational efficiency.

5.1.3 Staffing Issues

Insufficient staffing and a large number of patients contributed significantly to the delay, which was similar to the findings of Sestan et al. (2009) and Henderson et al. (2012) respectively. Both studies highlighted the impact of high workload and understaffing on the productivity and stress of clinical physicians. Addressing labour shortages, especially during peak hours, is critical to improving efficiency.

5.1.4 Technological Constraints

Technical constraints including outdated pharmacy management systems were highlighted as barriers to efficiency. This finding was confirmed by Al-Jumaili et al. (2020), who revealed that the implementation of automated dispensing systems reduced medication errors and delays. Technology upgrades and adequate IT support are important steps to enhance hospital and pharmacy operations.

5.1.5 Training and Professional Development

Qualitative research highlighted the need for ongoing training and professional development. Marzolini et al. (2022) also highlighted the importance of continuing education for physicians, especially in light of evolving medical practices and challenges posed by the COVID-19 pandemic. Investing in training programs can help physicians stay up-to-date on best practices and improve their performance.

5.2 Comparison with Other Studies

The findings of this study are broadly consistent with the existing literature on clinical medication dysfunction. Several studies by Sestan et al. (2009), Pedersen et al. (2016), and Poon et al. (2018), have identified similar challenges and areas for improvement. These consistent trends suggest that the findings at Medanta Hospital are not unique but suggest that there are broader clinical and pharmacological trends.

However, some differences were noted. For example, the degree to which technical constraints affected performance varied across studies. While Al-Jumaili et al. (2020) emphasized the benefits of automated systems, while other studies, such as Bond et al. (2019), found that human factors, such as communication and personnel, play an important role in improving productivity. These changes emphasize the need for tailored solutions that address specific organizational contexts.

5.3 Strengths of the Study

- **Comprehensive Data Collection:** The study employed both quantitative and qualitative methods, providing a robust analysis of workflow inefficiencies.

- **Real-time Observations:** The prospective observational design allowed for real-time data collection, enhancing the accuracy and relevance of the findings.
- **Multiple Perspectives:** Involving both patients and clinical pharmacists provided a holistic view of the workflow challenges and delays.

5.4 Limitations of the Study

- **Limited Generalizability:** The study was conducted in a single hospital, which may limit the generalizability of the findings to other settings.
- **Potential Observer Bias:** Despite efforts to minimize bias, the presence of observers might have influenced the behaviour of clinical pharmacists and other staff.
- **Sample Size Constraints:** While the sample size was adequate for the study's purposes, a larger sample might provide more comprehensive insights.

5.5 Implications of Findings

The results of this study have several important implications for clinical pharmacy practice at Medanta Hospital and potentially other similar settings:

1. **Process Optimization:** The pharmaceutical process should be streamlined, perhaps through automation or improved efficiency.
2. **Enhanced Communication:** The use of more effective communication tools and systems can reduce delays and improve communication between health professionals.
3. **Staffing Strategies:** Addressing personnel issues, especially in times of great need, is essential to maintaining productivity.
4. **Technology Upgrades:** Operational efficiency can be greatly enhanced by investing in modern pharmaceutical systems and providing adequate IT support.
5. **Continuous Training:** Providing ongoing training and professional development opportunities for clinical physicians is essential to maintaining high quality care.

Chapter 6: Conclusion

6.1 Summary of Findings

The aim of this study was to identify and analyse administrative process inefficiencies and delays in the clinical pharmacy department of Medanta Hospital. Key findings from time course research and qualitative interviews point to several key areas of concern:

1. **Nursing Recognition:** The most time-consuming process in the process, with considerable variation in processing time. This step was identified as one of the most important obstacles to performance
2. **Communication Barriers:** Common causes of delays emphasizing the need for improved communication tools and systems among healthcare professionals.
3. **Staffing Issues:** Large number of patients and insufficient staff contributed most to inefficiency. Addressing these issues is critical to increasing productivity.
4. **Technological Constraints:** Outdated pharmacy systems were identified as a major barrier to efficiency, indicating the need for system upgrades and better IT support
5. **Training and Professional Development:** Continuous training and professional development is essential for physicians in hospitals to keep pace with evolving clinical practices and improve their skills.

6.2 Implications of Findings

The findings have several important implications for the practice of clinical medicine at Medanta Hospital and may lead to other similar situations:

- **Process Optimization:** Simplifying the medication process through automation or improved workflow can significantly reduce delays.
- **Enhanced Communication:** Implementing more effective communication tools and protocols can improve coordination among healthcare providers and reduce delays.
- **Staffing Strategies:** Addressing staffing issues, especially during high-demand periods, is crucial for maintaining efficient operations and reducing workload on clinical pharmacists.

- **Technology Upgrades:** Investing in modern pharmacy management systems and providing adequate IT support can enhance workflow efficiency and reduce technological constraints.
- **Continuous Training:** Providing ongoing training and professional development opportunities for clinical pharmacists is essential for maintaining high standards of care and improving efficiency.

6.3 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. **Automate Medication Preparation:** Invest in automated dispensing systems to streamline pharmaceutical manufacturing and reduce shelf-life variability.
2. **Improving Communication Tools:** Develop and implement effective communication tools and policies to enhance communication between health professionals.
3. **Optimize Staffing Levels:** Staffing should be regularly analysed during peak periods to reduce workload and improve efficiency.
4. **Upgrade Technology:** Invest in modern pharmacy systems and ensure regular maintenance and updating to minimize technological barriers.
5. **Enhance Training Programs:** Continuous training and professional development programs will be implemented to provide clinical pharmacists with the latest clinical practices and technologies..
6. **Computerized physician order entry (CPOE),** also known as computerized provider order entry or computerized provider order management (CPOM), involves electronically entering medical practitioner instructions for patient treatment, particularly in hospital settings. These orders are transmitted via computer networks to relevant medical departments such as pharmacy, laboratory, or radiology for execution. CPOE aims to streamline order distribution, enhance efficiency by minimizing transcription errors and duplicate entries, and simplify tasks like inventory management and billing. It serves as a type of patient management software designed to improve healthcare delivery processes.

6.4 Conclusion

The study was able to identify major business process inefficiencies and delays in the clinical medicine department of Medanta Hospital. The findings highlight the importance of addressing medical barriers, communication barriers, personnel issues, and technical barriers to improve overall performance. By implementing recommended strategies, Medanta Hospital can increase the efficiency and effectiveness of its medical and pharmaceutical services, ultimately improving patient care and safety.

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Annexures

Study Tools

Gender * ☒ Male ☐ Female ☐ Prefer not to say
Age * 27
Years of experience * Your answer
Job role * Your answer
On average,how many hours do you spend on direct patient care activities per shift? * ☐ Less than 1 hour ☐ 1-2 hours ☐ 2-4 hours ☐ More than 4 hours
How do you prioritise your tasks when faced with multiple demands on your time? * ☐ Urgency of patients needs ☐ Complexity of medication regimen ☐ Availability of resources ☐ Time constraints
What challenges do you encounter your daily workflow ? * ☐ High patient volume ☐ Time constraints ☐ Inadequate staffing ☐ Limited resources ☐ Communication barriers with health care providers ☐ Other:
How do you think workflow efficiency and resource allocation could be improved in the clinical pharmacy department? * Your answer
Please use this space to provide any additional comments or insights regarding workflow dynamics and resource allocation in the Clinical Pharmacy department . * Your answer

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