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"Assessment of Turnaround Time in Outpatient and Inpatient Pharmacy Services of a Multi-Specialty Hospital"

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Abstract: Medication turnaround time refers to the duration between the initiation of a medication order either through manual entry or electronic prescribing and its administration to the patient. Monitoring this parameter in both outpatient (OP) and inpatient (IP) settings serves as a critical indicator for assessing the efficiency of pharmacy services and their direct impact on the quality of patient care.

Objective: To identify and analyze delays within the order-to-delivery process of outpatient (OP) and inpatient (IP) pharmacy services, and to determine the average turnaround time required for dispensing medications and medical consumables to patients.

Method: A time–motion study was conducted in both the outpatient (OP) and inpatient (IP) pharmacies of a multi-specialty hospital to evaluate medication turnaround time. A total of 100 indents were selected using a non-probability convenience sampling technique. Of these, 60% were IP patient indents, 25.6% were OP patient indents, and 14.4% were urgent indents. The study utilized both primary and secondary data sources. Primary data were collected through direct observation of the medication dispensing process, while secondary data were extracted from the hospital's Track Care software, which is routinely used for pharmacy order processing and monitoring. For analysis, the data were systematically compiled and processed using Microsoft Excel for graphical representation and trend analysis.

Results: The study revealed that 60% of inpatient indents, 25.6% of outpatient indents, and 14.4% of urgent indents experienced delays in delivery. The average turnaround time for inpatient indents was approximately 15 minutes under normal conditions; however, during periods of high patient flow, delays were frequently observed. For outpatient indents, the average delivery time was around 10 minutes, though in some instances it extended up to 40 minutes. Urgent indents were typically completed within 16 minutes, but when medications were unavailable in the pharmacy and had to be procured from the central store, the turnaround time extended to 40–50 minutes, exceeding that of both inpatient and outpatient indents. The analysis further indicated that the peak hours for indent requests occurred between 10:00 p.m. and 12:00 a.m., a period that coincided with limited staff availability. This mismatch between workload and workforce capacity contributed significantly to the delays observed. On average, the pharmacy processed approximately 290 indents per day, highlighting the high operational demand placed on the department.

Conclusion: This study identified several factors contributing to delays in the delivery of pharmacy indents to patients. The findings demonstrated that all categories of indents routine, outpatient, and even urgent requests were affected by delays, with urgent indents emerging as a significant concern due to their critical nature. The results also highlighted two key areas requiring improvement: staff training and technology support. Regular training for nursing staff on proper indenting practices is essential to reduce avoidable errors and enhance the efficiency of the order-to-delivery cycle. Additionally, the limitations of the existing medication tracking system were noted as a major challenge. Strengthening the technological infrastructure with reliable, real-time tracking could streamline processes and ensure smoother coordination. Overall, the study provides evidence that addressing these operational and technological gaps will not only improve the turnaround time (TAT) of pharmacy indents but also contribute to enhancing patient safety, treatment efficiency, and overall quality of care.

Keywords: Medication Turnaround Time, Inpatient Pharmacy, Outpatient Pharmacy, Dispensing Delays, Hospital Pharmacy Efficiency

I. Introduction:

Efficient and timely delivery of medications is a fundamental component of hospital pharmacy services, as it directly influences treatment outcomes, patient safety, and overall quality of care. The concept of **Medication Turnaround Time (TAT)** defined as the interval between the initiation of a medication order and its administration to the patient serves as an important operational metric for evaluating the performance of pharmacy systems. Delays in this process can lead to treatment interruptions, extended hospital stays, and increased risk of adverse events, thereby highlighting the need for continuous monitoring and improvement.

Pharmacy services in both **outpatient (OP)** and **inpatient (IP)** settings face unique challenges that contribute to variability in turnaround times. In outpatient pharmacies, high patient flow, prescription complexity, and counseling requirements can create bottlenecks, whereas inpatient pharmacies often deal with urgent requests, admission-related orders, and the coordination of multiple healthcare professionals. These factors make it essential to systematically assess TAT in both contexts to identify inefficiencies and optimize resource allocation.

Technological advancements, such as **electronic prescribing systems and pharmacy information software**, have improved the accuracy and traceability of medication orders. However, operational barriers including inadequate workforce alignment during

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peak hours, limited inventory management practices, and insufficient staff training continue to affect timely dispensing. Addressing these challenges requires a structured approach to evaluate workflow processes and implement evidence-based interventions.

Given this background, the present study focuses on assessing medication turnaround time in the OP and IP pharmacies of a multi-specialty hospital. By analyzing delays, quantifying average delivery times, and identifying critical bottlenecks, the study aims to generate insights that can guide strategies for enhancing efficiency, reducing delays, and strengthening patient care delivery within hospital pharmacy services.

II. Methodology

This study employed a time–motion design and was conducted over a period of two weeks in both the Out-Patient (OP) and In-Patient (IP) pharmacy areas of the hospital. A total sample size of 100 admitted patients was observed. Among the 100 (100%) indents recorded, 60 (60%) were from IP pharmacy, 26 (25.6%) were from OP pharmacy, and 14 (14.4%) were categorized as urgent indents. The sampling technique adopted was non-probability convenience sampling.

The study was carried out in two distinct phases. Phase I (one week) involved an observational assessment to understand pharmacy operations, specifically the time taken from order placement to pharmacy verification and from pharmacy verification to final delivery. Phase II (two weeks) focused on the systematic collection of medication order data, along with the identification of factors causing delays in pharmacy workflows. Based on these findings, recommendations were formulated to address the challenges identified. The quantitative data collected were analyzed using SPSS and Microsoft Excel, ensuring accurate evaluation of turnaround times and associated delays.

III. Results and Discussion

The pharmacy workflow, beginning with the indent raised by the inpatient (IP) nurse or outpatient (OP) order through the electronic patient record system and ending with the delivery of medicines to the respective wards by the porter, was broken down into sequential steps:

1. Ordering of medicines from wards, ICU, or OP units.
2. Printing the order in the pharmacy department.
3. Collection of medicines, including verification of drug name, patient details, and expiry date.
4. Placement of the collected drugs on racks according to ward allocation.
5. Verification and dispatch of the drugs.
6. Delivery of medicines to the wards.

The average total turnaround time (TAT) for processing and delivering an indent was observed to be 15 minutes under normal conditions, but could extend to 30–50 minutes during peak hours. The average TAT for packing the indent after it was generated by nursing staff was 5 minutes. The average TAT for printing and preparing the packing slip in the store was 10 minutes, with slips often remaining unattended on the printer for an average of 11 minutes. The collection of medicines accounted for an average TAT of 16 minutes, while the average time for drugs to exit the pharmacy store was 21 minutes.

A significant concern identified was the delay in dispatching medicines after collection, as drugs were often left on racks for extended periods before being sent to wards. This led to unnecessary delays, primarily due to limited manpower and inefficiencies in dispatching practices. Once dispatched, however, the average delivery time to the respective wards was 3 minutes. These findings highlight that while the core processes of ordering, verification, and collection were moderately efficient, the bottleneck occurred at the dispatch stage, suggesting the need for workflow optimization and appropriate staffing to reduce delays and improve medication turnaround time.

Outpatient (OP) and Inpatient (IP) Indents

The ideal Turnaround Time (TAT) set for pharmacy services was as follows:

1. Inpatient (IP) indents – 40 minutes
2. Urgent indents – 10 minutes
3. Outpatient (OP) indents – 30 minutes

A total of 60 inpatient indents were tracked. Among these, 25 indents (41%) exceeded the standard TAT of 40 minutes, while 35 indents (59%) were completed within 15 minutes or less.

For urgent or emergency indents, a total of 14 requests were monitored. Of these, 4 indents (29%) experienced delays, while 10 indents (71%) were delivered within the stipulated timeframe. However, in instances where the required medicines were unavailable in the pharmacy and had to be procured from the central store, the average delivery time extended up to 45 minutes. This is particularly concerning, as the hospital's Standard Operating Procedures (SOPs) mandate that urgent indents should be fulfilled

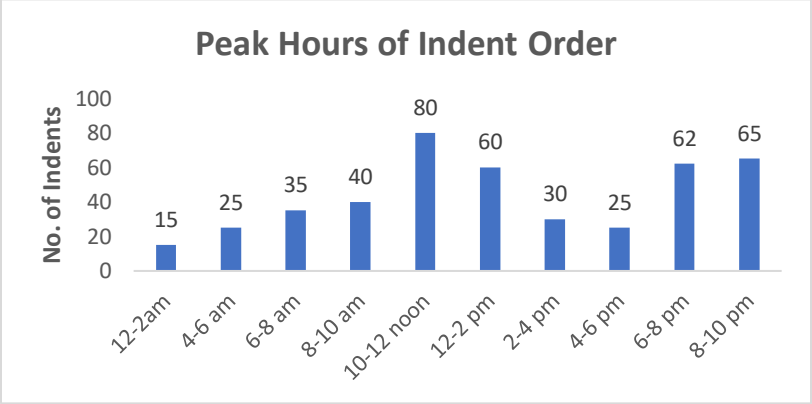
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within 15 minutes. Further analysis revealed that the exit process of drugs from the pharmacy contributed significantly to delays, with an average of 15 minutes and in some cases extending to 45 minutes. In inpatient indents, delays often occurred because pharmacy staff waited for General Duty Assistants (GDAs) to collect the medicines, and in many cases, the GDAs failed to arrive on time. This gap highlights the need for streamlined dispatch mechanisms and accountability measures to ensure timely drug delivery.

Peak Hours of Indent Orders

Secondary data extracted from the hospital system over a two-week period was analyzed to determine the peak hours of indent orders. The averages calculated from this data revealed that the majority of indents originated from the ward level, highlighting the need for additional training for nursing staff and the adoption of more advanced technological solutions to streamline the process.

Figure No. 1.: Peak hours of indent, order was between 10:00pm to 12:00am.

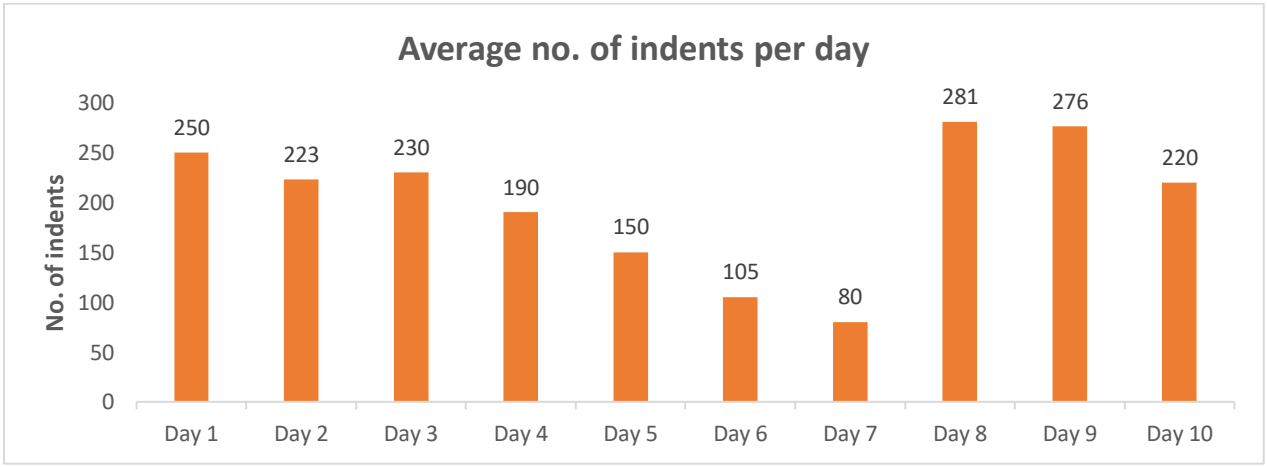


Average Number of Indents per Day

During the two-week study period, a total of 3,920 indents were placed, averaging 280 indents per day (Figure 2). The analysis indicated several operational challenges:

- Outpatient (OP) and urgent indents were often not prioritized, leading to further delays.
- Even after drug collection, medicines were kept on racks for extended periods before dispatch.
- Manpower shortages contributed significantly, as assistants responsible for delivering medicines were often engaged in collecting drugs for other indents or unavailable due to leave, with limited relievers to cover their absence.
- Dispatch delays also occurred when assistants waited for General Duty Assistants (GDAs) from respective wards, who frequently failed to arrive on time.
- In cases where one medicine listed in the indent was unavailable (stock-out), all other ready medicines were withheld on racks until the missing item was sourced or purchased locally.
- Lack of a systemized tracking process further complicated timely dispatch, making it difficult to confirm whether medicines had been delivered.

Figure No. - 2: Average number of indents per day.



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These were the few reasons for delay:

- Several specific causes of delays were observed:
- Prescriptions written without verifying stock availability, leading to additional time in sourcing medicines.
- Software limitations requiring pharmacists to manually process certain indents when automated packing failed.
- Random or repeated indents from wards within short intervals (1–2 times within 10 minutes).
- Instances where dispatched medicines, particularly expensive drugs, failed to reach the wards, often due to inefficiencies or lapses in porter-based delivery systems.

Summary

Overall, the findings emphasize that delays were not only due to staffing shortages but also linked to workflow inefficiencies, lack of real-time tracking, and absence of robust technological support. Addressing these gaps through system integration, workforce planning, and stricter monitoring mechanisms would significantly improve medication turnaround time and patient care.

IV. Recommendations

To improve the efficiency of pharmacy services and reduce turnaround time, the following measures are suggested:

- Patient-Tagged Dispatch Bags – Medications should be dispatched in bags labeled with the respective patient's details. This will minimize segregation time at the nursing station and reduce the risk of mix-ups.
- Priority for OP and Urgent Indents – The pharmacy software must highlight outpatient (OP) and urgent indents distinctly, ensuring they receive immediate attention. Once collected, these items should be dispatched without being held in racks based on departmental sorting.
- Manpower Allocation – Staffing levels must be periodically reviewed to ensure adequate manpower, especially during peak hours. Priority should be given to handling urgent and outpatient requests promptly.
- Bulk Ordering Practices – Nursing staff should be encouraged to place complete orders at once rather than submitting multiple partial indents. For routine daily indents, fixed timings (excluding peak evening or night hours) may be established to streamline workflow.
- Time-Stamped Verification – Every indent order signed by nursing staff should include the time and employee ID. This will enable accurate tracking of medicine delivery to the wards and accountability in case of discrepancies.
- Training and Induction Programs – Regular training sessions should be conducted for staff involved in indenting and dispensing processes. Additionally, these practices should be included as part of the induction program for new employees.
- Advanced Tracking Systems – Implementation of an improved, real-time medicine tracking system is essential to monitor order status, reduce delays, and strengthen communication across departments.

V. Conclusion

Patient safety and quality of care are directly linked to the efficiency of the medication process—from prescribing and verification to dispensing and administration. Minimizing delays not only prevents interruptions in therapy but also reduces the likelihood of medication errors. This study highlights critical gaps in communication, workforce allocation, and technological infrastructure within the pharmacy services of a multi-specialty hospital. The findings emphasize the organizational need to strengthen internal processes, including nursing practices, physician support, and pharmacy operations.

Furthermore, the insights gained on ordering and dispatch practices provide valuable input for staff training and process standardization across departments. Although the study did not achieve a drastic reduction in overall turnaround time, significant improvements were observed in identifying delay points and proposing corrective measures Most importantly, the implementation of a robust tracking system is recommended as a key solution to ensure accountability, streamline workflows, and enhance patient safety. Ultimately, addressing these gaps will lead to better turnaround times (TAT), improved patient care, and higher operational efficiency.

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