ORIGINAL RESEARCH

Evaluating the potential of electronic health records (EHRs) to improve patient flow and continuity of care: A three-month baseline study at a tertiary care hospital in Jaipur

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ABSTRACT
Background: Although Electronic Health Records (EHRs) have been shown to streamline clinical workflows and enhance patient outcomes in many settings, hospitals that still rely on paper-based systems may experience fragmented documentation and communication challenges. In a 1450-bed super-specialty hospital in Jaipur that currently does **not** use an EHR system, we conducted a baseline assessment to understand existing patient flow and continuity of care processes. This study explored how adopting an EHR might improve wait times, bed turnover, and care coordination in the future. **Methods:** A prospective, observational study was undertaken at Mahatma Gandhi Medical College & Hospital, Jaipur, from August to October 2024. Three high-volume departments—Emergency, Internal Medicine, and Orthopedics—were selected for detailed baseline measurements. Quantitative data on average wait times, bed turnover rates, and length of stay (LOS) were collected through existing paper-based and manual documentation processes. Qualitative feedback from clinicians and patients was gathered via structured interviews and surveys to gauge current pain points and the perceived potential benefits of a future EHR implementation. **Results:** Baseline data showed inefficiencies in patient throughput, prolonged wait times, and communication gaps among care teams. Patients and staff identified several areas where a centralized electronic system could potentially streamline workflows, reduce duplicative tasks, and enhance the overall patient experience. While most participants anticipated that an EHR could lead to improvements, concerns regarding training, costs, and change management were also prominent. **Conclusion:** The findings suggest that **introducing an EHR** has the potential to improve patient flow and care coordination in a high-volume tertiary care hospital. However, successful adoption will require robust stakeholder engagement, comprehensive training, and careful planning to overcome anticipated barriers. Future research should quantify the actual impact of EHR implementation once deployed and consider long-term sustainability and cost-effectiveness.
Keywords: Electronic Health Records; Patient Flow; Continuity of Care; Hospital Information Systems; Tertiary Care; Quality Improvement

INTRODUCTION

Hospitals worldwide face increasing pressures to optimize resource use, enhance patient safety, and manage operational costs, especially amidst growing patient volumes and limited budgets [1]. Numerous studies have highlighted Electronic Health Records (EHRs) as a transformative tool for meeting these demands, given their ability to centralize patient data, streamline documentation, and foster coordinated care [2]. However, many facilities—particularly those still reliant on paper-based systems—continue to grapple with communication silos, repetitive documentation, and delayed access to essential patient information [3].

In hospitals without EHRs, continuity of care can be compromised due to fragmented records and

incomplete handoffs among multiple providers [4]. Continuity of care is crucial for ensuring that patients receive consistent, coordinated treatment across different departments and healthcare settings [5]. A well-designed EHR has the potential to mitigate these risks by serving as a shared digital repository of clinical notes, diagnostic results, and medication orders, thereby facilitating real-time decision-making [6].

Mahatma Gandhi Medical College & Hospital in Jaipur is a 1450-bed super-specialty center serving a large and diverse patient population. Despite its high patient load, the hospital currently operates on a paper-based documentation system. Recognizing the limitations of this approach, the hospital administration has been exploring the feasibility of transitioning to an EHR platform. As a preparatory step, we conducted a three-month baseline assessment in three departments with the highest volumes—Emergency, Internal Medicine, and Orthopedics—to evaluate current processes and identify gaps that an EHR might address.

The primary objective of this baseline study was to document existing patient flow challenges and assess continuity of care in these departments. By capturing both quantitative metrics (wait times, length of stay, bed turnover) and qualitative perspectives (staff and patient feedback), we aim to lay the groundwork for a successful EHR adoption strategy. We hypothesize that, if implemented, an EHR could reduce operational inefficiencies, support better care coordination, and enhance overall patient and provider satisfaction.

MATERIALS AND METHODS
Study Design and Setting
A prospective, observational study was conducted at Mahatma Gandhi Medical College & Hospital, Jaipur, from August to October 2024. This facility does **not** currently have an EHR system in place. Three departments—Emergency, Internal Medicine, and Orthopedics—were chosen for detailed observation based on their high patient volumes and complexity of cases.

Ethical Approval
The Institutional Ethics Committee of Mahatma Gandhi Medical College & Hospital approved the study protocol. All participants were informed of the study objectives, and written consent was obtained prior to enrollment. Confidentiality measures were strictly followed.

Participant Selection and Data Collection
1. **Clinical Staff:** Physicians, nurses, and administrative personnel from each of the three departments were invited to participate in structured interviews. Convenience sampling was used to recruit staff most involved in current paper-based documentation and patient flow processes.
2. **Patients:** Adult patients ($\geq$18 years) with at least two visits or admissions to the selected departments were invited to complete surveys assessing their experiences. Convenience sampling was also used for patient recruitment.

Quantitative Data
- **Average Wait Times:** Time from patient arrival until triage (Emergency) or first consultation (Internal Medicine, Orthopedics).
- **Length of Stay (LOS):** Duration from admission to discharge for inpatients.
- **Bed Turnover Rates:** Ratio of the total number of discharges to the average number of available beds in each department.

These metrics were extracted **manually** from existing paper registers and departmental logs. The aim was to establish a baseline so that future improvements can be measured once an EHR is implemented.

Qualitative Data
- **Structured Interviews (Staff):** Explored staff perceptions of current workflow challenges, communication gaps, and expectations for how an EHR might improve or complicate their tasks.
- **Patient Surveys:** Assessed satisfaction regarding care coordination, waiting experience, and communication with healthcare providers. A five-point Likert scale was used to capture levels of agreement or satisfaction.

Data Analysis
Quantitative data were summarized using descriptive statistics, including means and standard deviations. While no direct pre- vs. post-EHR comparison was possible (as the EHR is not yet in use), these baseline figures serve as a reference for future studies. Qualitative interviews were analyzed thematically using NVivo software to identify common challenges and anticipated benefits of a potential EHR.

RESULTS
Baseline Operational Metrics
Table 1 presents the average wait times, LOS, and bed turnover rates across the three departments during the three-month study. These metrics highlight existing bottlenecks and inefficiencies in the hospital's current paper-based workflow.

TABLE 1. BASELINE OPERATIONAL METRICS (AUGUST–OCTOBER 2024)

Metric	Emergency	Internal Medicine	Orthopedics
Average Wait Time (min)	50.3 ± 14.2	44.1 ± 10.5	42.8 ± 11.0
LOS (days)	3.6 ± 0.8	6.1 ± 1.5	5.7 ± 1.2
Bed Turnover Rate (ratio)	4.6 ± 1.0	4.5 ± 1.1	4.8 ± 0.9

Overall, the Emergency Department exhibited the highest wait times, while Internal Medicine showed the longest LOS. Bed turnover rates across all departments indicated relatively slow patient throughput.

Qualitative Insights

- **Staff Perspectives:** The majority of staff (76%) reported significant clerical workload, citing repeated data entry on paper and difficulties in coordinating with other departments. Over 80% believed an EHR could centralize patient records, reduce duplication, and expedite decision-making. However, some expressed concerns about potential system downtime and the need for extensive training.

- **Patient Feedback:** Many patients reported delays in lab results and confusion regarding follow-up visits. There was a general consensus that a digital system could improve communication and transparency, especially for scheduling and medication tracking. Some patients, however, worried about the privacy of electronic data and the potential for errors during a transition from paper-based methods.

TABLE 2. PATIENT SATISFACTION SURVEY (5-POINT LIKERT SCALE)

Domain	Mean Score (Current Paper-Based System)
Coordination of Care	3.2 ± 0.9
Communication with Providers	3.4 ± 0.8
Overall Satisfaction	3.6 ± 1.0

DISCUSSION

The baseline data from this study underscore the challenges inherent in a large, paper-based hospital system. Delays in patient movement (reflected in higher wait times and LOS) and lower-than-optimal bed turnover rates suggest that the hospital's existing workflow could benefit substantially from digitalization. These findings mirror those of prior research indicating that EHRs, when properly implemented, can streamline processes, reduce paperwork, and enhance care coordination [7,8].

However, the transition to an EHR is not without obstacles. The qualitative feedback points to concerns related to cost, technological literacy, and system interoperability. Effective training programs and robust IT support will be critical to mitigate disruptions during and after EHR deployment [9]. Additionally, patient skepticism regarding data privacy must be addressed through transparent communication and adherence to stringent security protocols [10].

This study's significance lies in providing a clear **baseline** against which future EHR adoption can be measured. Although actual improvements cannot be quantified until the system is deployed, establishing these reference metrics is essential for conducting meaningful pre- vs. post-implementation comparisons later on. Similar baseline-focused research has helped other institutions identify priority areas and tailor their EHR rollout strategies more effectively [11,12].

Limitations

1. The study's three-month duration may not fully capture seasonal variations or fluctuating patient volumes.

2. The findings are specific to three high-volume departments in one hospital, possibly limiting generalizability.

3. Perceived benefits of EHR usage remain hypothetical until the system is in place, making it impossible to confirm actual efficacy at this stage.

CONCLUSION

In a tertiary care hospital that currently lacks an EHR system, our three-month baseline assessment reveals significant opportunities for improving patient flow and continuity of care. The quantitative metrics highlight specific inefficiencies—long wait times, prolonged LOS, and suboptimal bed turnover—while qualitative feedback underscores both enthusiasm for and concerns about a potential digital transformation. These findings provide a robust starting point for informed EHR planning and lay the groundwork for future evaluation of actual outcomes once an EHR is implemented. Success will hinge on careful preparation, ongoing training, and proactive stakeholder engagement.

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