



A-JMRHS

ASSESSMENT OF BED MANAGEMENT STRATEGIES AND THEIR IMPACT ON PATIENT FLOW IN A CORPORATE HOSPITAL IN SOUTH CHENNAI

Dr. H. Dinesh Deepak^{1*}, Dr. P. Balaji², Dr. Nitish R. Jayaharan³

^{1*}MBBS, MPH, MRCPs, MBA, Medical Manager, SRM Institute of Medical Sciences.

²MS, Ph.D, FRCS, FCLS, Director of Medical Services, SRM Institute of Medical Sciences.

³Junior Resident, Department of General Surgery and Minimal Invasive Surgery, SRM Institute of Medical Sciences.

Corresponding Author: Dr. H.Dinesh Deepak

MBBS, MPH, MRCPs, MBA, Medical Manager, SRM Institute of Medical Sciences.

Email: drdineshdeepak@gmail.com

ABSTRACT

Efficient hospital bed management is essential for maintaining smooth patient flow, minimizing delays, and improving the quality of healthcare delivery. This study evaluates bed occupancy patterns and factors influencing admission and discharge delays in a Corporate Hospital, South Chennai. Key parameters assessed include bed occupancy rate, bed turnover rate, average length of stay, insurance pre-approval delays, and reasons contributing to delayed admissions and discharges.

A descriptive quantitative research design was adopted using data collected from inpatient admissions through simple random sampling. Percentage analysis was used to evaluate trends in bed utilization and patient movement within the hospital. The findings revealed that bed occupancy was highest during February, while the average length of stay peaked in December. Delays in insurance authorization, inpatient billing procedures, and limited bed availability were identified as the major causes of delayed admissions and discharges. The study highlights the need for real-time bed tracking systems, streamlined insurance processing, efficient discharge planning, and improved coordination between departments to enhance bed utilization and patient satisfaction.

Keywords: Bed Occupancy, Patient Flow, Bed Management, Length of Stay, Hospital Administration, Insurance Delay, Healthcare Management, Patient Satisfaction.

INTRODUCTION

Effective bed management plays a crucial role in ensuring uninterrupted patient flow and efficient healthcare delivery within hospitals. Proper allocation and utilization of beds directly influence patient outcomes, waiting times, operational efficiency, and hospital expenditure. Bed management involves coordinating admissions, transfers, and discharges to maximize the use of available resources while maintaining quality patient care.

Inadequate bed availability and delays in admission or discharge processes can contribute to overcrowding, prolonged waiting periods, reduced patient satisfaction, and increased burden on healthcare staff. Administrative issues such as delays in insurance approval, discharge documentation, and inpatient billing further affect hospital efficiency.



www.ajmrhs.com
eISSN: 2583-7761

Date of Received: 18-04-2026

Date Acceptance: 28-04-2026

Date of Publication: 29-05-2026

Hospitals must continuously monitor bed occupancy rates, bed turnover rates, and average length of stay to identify operational bottlenecks and improve

patient movement. Technological interventions such as automated bed tracking systems, predictive discharge planning, and integrated communication systems have demonstrated significant benefits in optimizing bed utilization.

This study was conducted to assess the factors affecting bed occupancy and patient flow in a Corporate Hospital, South Chennai, and to identify practical strategies that may improve admission and discharge efficiency.

Objectives

1. To evaluate the hospital bed occupancy rate in a Corporate Hospital, South Chennai.
2. To analyze factors contributing to delays in patient admission and discharge.
3. To assess the impact of insurance pre-approval delays on patient flow.
4. To study the average length of hospital stay among inpatients.
5. To suggest measures for improving bed management and patient flow efficiency.

LITERATURE REVIEW

Yun, S., et al. — “A Data-Driven Hybrid Three-Stage Framework for Hospital Bed Management” emphasizes the use of data-driven modeling to improve bed allocation, balance patient demand

with available capacity, and enhance overall bed utilization.

Buerkle, A. et al. — “Decision Support for Hospital Bed Management Using Adaptable Length of Stay Estimations and Aggregated Resources” highlights the role of predictive length-of-stay estimation and decision-support tools in improving admission planning and reducing inefficiencies in bed use.

Suji, U., & Magalingam, A. — “A Study on Delay in Insurance Patients Discharge at a Multispeciality Hospital in Kerala” examines administrative and insurance-related delays in the discharge process, including insurance authorization and documentation issues that contribute to prolonged patient stays.

METHODOLOGY

- Research Design:** A descriptive quantitative research design was adopted to study patterns

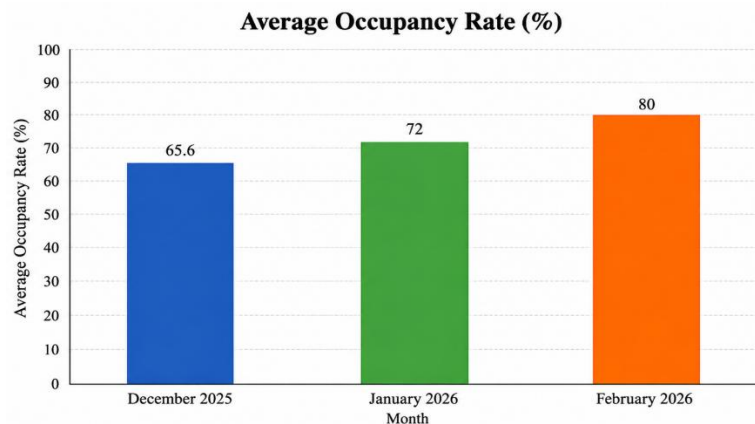
and outcomes associated with hospital bed management without manipulating study variables.

- Data Collection:** Primary data were collected directly from inpatient admission records and hospital administrative data.
- Sample Population:** The study population included inpatients admitted in a Corporate Hospital, South Chennai.
- Sample Technique:** Simple random sampling method was used for data selection.
- Tools and Analysis:** Data were analyzed using simple percentage analysis and represented using tables, bar diagrams, and pie charts.

ANALYSIS

1. Average Bed Occupancy Rate

MONTH	AVERAGE OCCUPANCY RATE
December 2025	65.6
January 2026	72
February 2026	80



The above table shows that the bed occupancy in the month of February is 80 % which is greater than all other months.

MONTH	TOTAL ADMISSION	TOTAL DISCHARGE	DEATH	BED TURNOVER RATE
December 2025	1403	1380	23	4.00
January 2026	1540	1525	15	4.42
February 2026	1534	1534	12	4.45

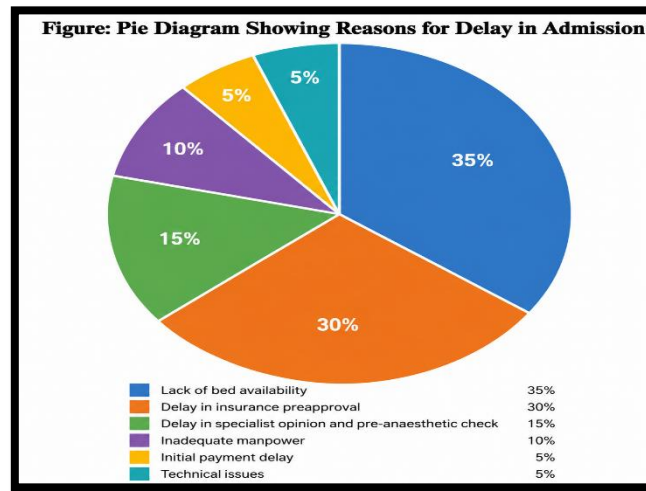
2. Bed Turnover Rate

The above table shows the bed turnover rate has increased from 4.42 in January to 4.45 in February showing an improvement in bed management.

3. Reasons For Delay In Admission

REASONS	FREQUENCY
Delay in Specialist opinion and pre anaesthetic check	15
Lack of bed availability	35

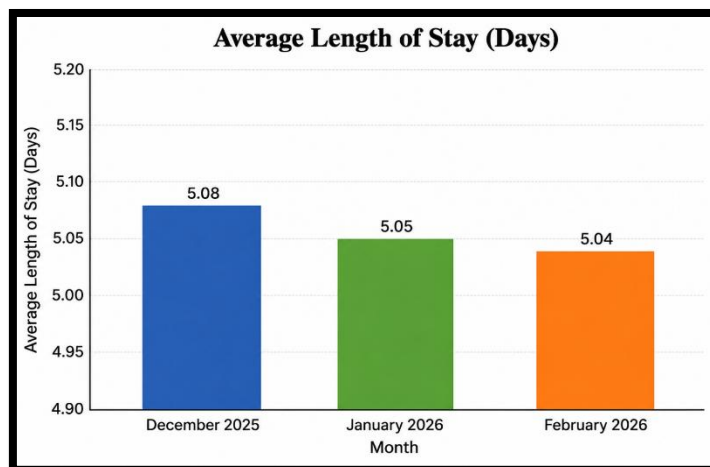
Inadequate manpower	10
Delay in insurance preapproval	30
Initial payment delay	5
Technical issues	5



The above table shows most delays in admission are due to lack of bed availability and delay in insurance pre-approval.

4. Average Length of Stay

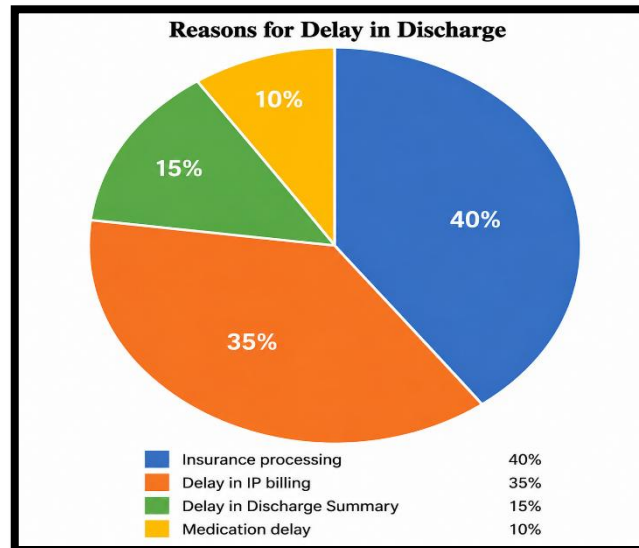
MONTH	AVERAGE LENGTH OF STAY
December 2025	5.08
January 2026	5.05
February 2026	5.04



The above chart shows the Average length of stay to be highest for the month of December.

5. Reason for Delay in Discharge

REASONS	FREQUENCY
Insurance processing	40
Delay in IP Billing	35
Delay in Discharge Summary	15
Medication delay	10



The above table and chart show that the delay in discharge is mainly due to insurance processing and delay in IP billing.

Findings

The study identified several operational factors affecting efficient patient flow within the hospital. Bed occupancy was found to be highest during the month of February, indicating increased demand for inpatient services during that period. The bed turnover rate showed a slight improvement from January to February, suggesting better utilization of available beds.

Delays in patient admission were primarily associated with limited bed availability and prolonged insurance pre-authorization procedures. Similarly, discharge delays were predominantly caused by insurance processing issues and delays in inpatient billing clearance. The average length of stay was observed to be highest during December, which may be related to seasonal disease burden and increased patient admissions.

The findings indicate that administrative inefficiencies, especially those involving insurance approval and discharge processing, significantly contribute to delayed patient movement and reduced bed availability.

Recommendations

- Regularly update bed management software to provide real-time information regarding bed availability.
- Increase staffing support in inpatient billing departments to minimize discharge delays.
- Introduce automated alerts for housekeeping personnel immediately after patient discharge.
- Transfer clinically stable patients to step-down wards whenever appropriate to improve ICU bed availability.

- Encourage early discharge planning with telehealth follow-up for clinically stable patients.
- Establish a discharge lounge for patients awaiting transportation or billing clearance.
- Improve patient transport services by assigning dedicated transport personnel for each hospital floor.
- Streamline insurance pre-authorization procedures through better coordination with insurance providers.

CONCLUSION

Efficient hospital bed management is essential for maintaining smooth patient flow, improving healthcare delivery, and optimizing hospital resources. The present study highlights that delays in insurance approval, inpatient billing, and bed allocation are major contributors to inefficient patient movement within SIMS Hospital, Chennai. The analysis demonstrates that improving coordination between admission departments, insurance teams, billing sections, and clinical units can significantly reduce delays in admission and discharge processes. Real-time monitoring of bed availability and early discharge planning may further enhance bed utilization and reduce patient waiting times.

Implementation of advanced bed management systems, streamlined insurance procedures, and improved communication among healthcare professionals can contribute to better operational efficiency and increased patient satisfaction. Continuous evaluation of bed occupancy indicators and patient flow patterns is necessary to ensure sustainable improvements in hospital administration.

REFERENCES

1. Luo L, Li J, Xu X, Shen W, Xiao L. A Data-Driven Hybrid Three-Stage Framework for Hospital Bed Allocation: A Case Study in a Large Tertiary Hospital in China. *Comput Math Methods Med*. 2019 May 2;2019:7370231. doi: 10.1155/2019/7370231. PMID: 31191709; PMCID: PMC6525901.
2. Schmidt R, Geisler S, Spreckelsen C. Decision support for hospital bed management using adaptable individual length of stay estimations and shared resources. *BMC Med Inform Decis Mak*. 2013 Jan 7;13:3. doi: 10.1186/1472-6947-13-3. PMID: 23289448; PMCID: PMC3621822.
3. Suji, U., & Magalingam, A. (2023). A Study on Delay in Insurance Patients Discharge at a Multispeciality Hospital in Kerala. *EPRA International Journal of Multidisciplinary Research*, 9(5), 1–5. <https://doi.org/10.36713/epra13080>.
4. Belciug S., Gorunescu F. Improving hospital bed occupancy and resource utilization through queuing modeling and evolutionary computation. *Journal of Biomedical Informatics*. 2015;53:261–269. doi: 10.1016/j.jbi.2014.11.010.
5. Davis, L. M., Johnson, M. P., & Smith, R. D. (2020). Addressing in-patient discharge delays: A quality improvement initiative. *Journal of Healthcare Quality*, 42(1), 56–67.
6. Brown, C. D., & Thompson, K. L. (2018). Managing In-patient Discharge Delays: Best Practices and Strategies. *Journal of Hospital Administration*, 42(2), 89–97.
7. Akcali E., Côté M. J., Lin C. A network flow approach to optimizing hospital bed capacity decisions. *Health Care Management Science*. 2006;9(4):391–404. doi: 10.1007/s10729-006-0002-4.
8. Bachouch R. B., Guinet A., Hajri-Gabouj S. An integer linear model for hospital bed planning. *International Journal of Production Economics*. 2012;140(2):833–843. doi: 10.1016/j.ijpe.2012.07.023.
9. Holm L. B., Lurås H., Dahl F. A. Improving hospital bed utilisation through simulation and optimisation: with application to a 40% increase in patient volume in a Norwegian general hospital. *International Journal of Medical Informatics*. 2013;82(2):80–89. doi: 10.1016/j.ijmedinf.2012.05.006.
10. Devapriya P., Strömblad C. T., Bailey M. D, et al. StratBAM: a discrete-event simulation model to support strategic hospital bed capacity decisions. *Journal of Medical Systems*. 2015;39(10):p. 130. doi: 10.1007/s10916-015-0325-0.
11. Roh T. P., Huschka T. R., Brown M. J., Marmor Y. N. Data-driven simulation use to determine bed resource requirements for the redesign of pre- and post-operative care areas. *Proceedings of the Winter Simulation Conference*; 2014; Washington, DC, USA. pp. 1168–1176.
12. Dumas M. B. Simulation modeling for hospital bed planning. *Simulation*. 1984;43(2):69–78. doi: 10.1177/003754978404300201.
13. Holm L. B., Lurås H., Dahl F. A. Improving hospital bed utilisation through simulation and optimisation: with application to a 40% increase in patient volume in a Norwegian general hospital. *International Journal of Medical Informatics*. 2013;82(2):80–89. doi: 10.1016/j.ijmedinf.2012.05.006.
14. Belciug S., Gorunescu F. Improving hospital bed occupancy and resource utilization through queuing modeling and evolutionary computation. *Journal of Biomedical Informatics*. 2015;53:261–269. doi: 10.1016/j.jbi.2014.11.010.
15. Cochran J. K., Bharti A. Stochastic bed balancing of an obstetrics hospital. *Health Care Management Science*. 2006;9(1):31–45. doi: 10.1007/s10729-006-6278-6.

How to cite this article: Dr. H. Dinesh Deepak, Dr. P. Balaji, Dr. Nitish R. Jayaharan, ASSESSMENT OF BED MANAGEMENT STRATEGIES AND THEIR IMPACT ON PATIENT FLOW IN A CORPORATE HOSPITAL IN SOUTH CHENNAI, *Asian J. Med. Res. Health Sci.*, 2026; 4 (2):-582-586.

Source of Support: Nil, **Conflicts of Interest:** None declared.