BED ALLOCATION PROCESS IN KIMS HOSPITAL AND IT'S EFFECTS ON PATIENT'S FLOW AND HOSPITAL EFFICIENCY

Dissertation Submitted to

The IIHMR University, Jaipur

For the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

In

Hospital and Health Management

By

MS. RASHI KABIA

Under the Supervision and Guidance of

MR. JAGAJEET PRASAD SINGH

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled "Bed allocation process in KIMS hospital and its effects on patient's flow and hospital efficiency: A Study" 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Name of Student

Date

ABSTRACT

Background:

The turnaround time for bed allotments is a crucial component of hospital operations, directly affecting patient flow and general effectiveness. This study focuses on identifying the causes of delays and suggesting solutions in order to analyse and improve the bed allotment turnaround time at KIMS Hospital.Data on bed allotment procedures, including patient admission, discharge, and bed availability, were gathered through a combination of quantitative study. To evaluate the current condition of bed allotment efficiency, key performance parameters including average turnaround time. Factors such as severity of illness, required care level, and capacity influence bed allotment decisions, which are often managed by dedicated departments using technology like electronic health records and bed management software. Effective bed allotment systems contribute to streamlined operations and improved healthcare delivery.

Objective:

Four Objectives relating to bed allocation in a hospital are addressed by this study. In order to allocate beds, the initial goal is to calculate the current Turnaround Time (TAT). Understanding the hospital's bed allocation process flow and outlining the stages required in assigning beds are the second objective's main goals. The third goal is to assess the percentage of delay cases in bed allocation depending on various payer categories, allowing an analysis of potential discrepancies or difficulties unique to each category. Lastly, the study intends to assess the causes of bed allocation delays, including elements like logistical problems, communication breakdowns, or resource constraints. By achieving these goals, the research hopes to better overall patient care in the hospital, optimise resource allocation, and improve the bed allocation process.

Methodology:

A descriptive observational study was carried out during the period of 27 February 2023 to 27 May 2023 at a Tertiary Care hospital in Secundrabad. The data collected was secondary data was collected from the HIMS software that was being used by the hospital for the allocation of beds to the patients. The sample considered was 209 based on convenience sampling. The study was carried out by recording the findings in a self-structured ER list. Data Analysis was done through advanced Microsoft Excel functions.

Result:

The results of the study indicate that there was a delay in bed allotment for approximately 42% of the patients, accounting for 88 patients out of a sample size of 209. On the other hand, around 58% of the patients, which is 121 patients, had their bed allotment done on time.Regarding the evaluation

of delay cases according to the payer type, the data reveals variations in bed allocation delays based on the payment method. With 50 out of 65 instances finished on time, corporate patients had the highest rate of timely bed allocation. Only 32 out of 76 cases involving insurance patients were resolved promptly, which was the greatest percentage of delayed bed allotment.The delays in bed allocation were attributed to a number of issues. These include staff-related problems like tardy billing and delayed bed cleaning, as well as concerns with departmental collaboration. Due to their hectic schedules and the lack of certain types of beds, bed board managers (BBMs) had to deal with difficulties. Other factors for delays included nurses failing to leave beds on time, beds not being released from housekeeping, and attendants not being available for financial counselling.

Conclusion:

The current study examined the bed allotment turnaround time (TAT), assessed the causes of bed allocation delays, and rated delay cases depending on payer type. The results showed that a sizable percentage of patients encountered delays, underscoring the requirement for change. An analysis of bed allocation efficiency by payer type revealed differences, with corporate payers seeing the highest rate of prompt allocation and insurance payers experiencing the highest rate of delays. The causes of delays were identified as attendant/patient preferences and staff-related problems. Implementing digital bed allocation systems, standardising practises, boosting staff communication and training, and controlling attendant and patient expectations are some recommendations. While this study has limitations, it provides insights that can guide hospitals in enhancing bed allocation efficiency, improving patient experience, and optimizing overall operations.

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I want to sincerely thank and appreciate everyone who helped to assist and contribute to the completion of this dissertation.

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TABLE OF CONTENT

ABBREVATIONS

FC	Financial Counselor
CS	Case sheet
DS	Discharge Summary
VP	Vice President
NA	Non- Availability
BE	Billing Executive
RM	Relationship Manager
AE	Audit Executive
HK	House Keeping
LOS	Length of Stay
RS	Radiology Secretary
RDE	Reports Dispatch Executive
TAT	Turn Around Time
PF	Process Flow
RM	Relationship Manager
FB	Floor Biller
Inv/Ser	Investigations/ Services
OT	Operation Theatre
DMO	Duty Medical Officer
F&B	Food and beverages
PF	Process Flow
NA	Non-Availability
RT	Radiology Technician
VP	Vice President

CHAPTER 1

INTRODUCTION

A critical component of hospital management is bed allotment turnaround time (TAT), which has a direct bearing on patient flow, resource use, and overall effectiveness. TAT is the amount of time between making a bed request and actually assigning a bed to a patient. Improved patient satisfaction, prompt treatment, and optimal bed utilisation can all result from cutting down on TAT.

According to a study conducted by Chawla et al. (2019)[i], In order to improve hospital productivity and patient outcomes, timely bed allocation is crucial. To ensure fast bed allocation, the study emphasised the value of tracking and optimising TAT. Reduced patient wait times, less overcrowding, and enhanced hospital performance are all possible outcomes of effective bed allocation systems.

Furthermore, research by Dubey et al. (2020)[ii], emphasised how delayed bed allocation affects patient flow and healthcare delivery. The study emphasised the need for efficient bed management techniques, such as real-time monitoring of bed availability, enhanced bed allocation algorithms, and improved teamwork among medical personnel.

Hospitals can enhance patient experience, maximise resource utilisation, and increase overall operational efficiency by concentrating on optimising bed allotment TAT. Positive results for patients and healthcare providers can result from the implementation of effective bed management systems and ongoing surveillance.

"A decision support methodology based on queuing theory was employed to estimate the demand for inpatient beds in hospitals" (J K Cochran et al. 2006)[iii]The capacity of hospital inpatient beds often evolves rather than being planned due to challenges in understanding patient demand and limited use of scientific methods for capacity estimation. This study examines four different data sets from hospitals to determine their consistency and usefulness in estimating actual bed demand. It concludes that financial data, specifically billing data, provides a more accurate measure of bed demand compared to traditional census data. Based on this finding, a capacity planning tool using queuing theory and financial data is developed in the form of an Excel spreadsheet. The tool allows for adjusting input parameters and monitoring the impact on bed needs across various levels of care. A case study from a major hospital in Phoenix, Arizona is presented to illustrate the application of these methodologies.

“Modelling for hospital bed capacity planning and management” (P R Harper et al. 2001)[iv]The complexity of a hospital's internal dynamics requires a thorough evaluation of bed capacities considering uncertainty, variability, and resource limitations. Traditional deterministic spreadsheet calculations used for capacity planning often underestimate the actual bed requirements. This paper emphasizes the need for more advanced and detailed capacity models that can account for various patient flows and their impact on bed needs over time. The presented simulation model, developed in collaboration with a major UK NHS Trust, enables the examination of the consequences of capacity planning policies and management strategies. The study also highlights the importance of evaluating bed capacities based on both occupancy rates and refused admission rates, as the relationship between the two is often complex but crucial for effective hospital management.

“ABV-CoViD: An Ensemble Forecasting Model to Predict Availability of Beds and Ventilators for COVID-19 Like Pandemics’’- In this paper, the authors propose the ABV-CoViD scheme, an ensemble forecasting model aimed at predicting the availability of beds and ventilators for COVID-19 patients. Based on the number of COVID-19 positive patients, the availability of beds, ventilators, and other factors, the plan takes regional resource allocation into account. To solve linear and non-linear dependencies, the model combines artificial neural network (ANN) and auto-regressive integrated neural network (ARIMA) approaches. The authors investigated the effectiveness of their scheme using COVID-19 healthcare data from three US regions, and found that it performed better than other resource allocation techniques in terms of accuracy. The outcomes demonstrate the efficiency of the ABV-CoViD method for estimating the availability of resources for COVID-19 patients. V. K. Prasad et al.(2022)[v]

With regard to TAT, variances based on payer type, and underlying causes of delays, the study intends to offer insightful information about the hospital's bed allocation procedure. With the use of this data, managers and healthcare professionals may better allocate resources, identify areas for development, and increase the overall effectiveness of the hospital's bed management system.

Following are the study's objectives:-

OB1: To determine the hospital's process for allocating beds

OB2: To determine the hospital's current bed allotment TAT

OB3: To determine the hospital's ratio of delay cases according to payer type

OB4: To determine the causes of bed allocation delays

A study on bed allotment turnaround time (TAT) helps hospitals and healthcare systems in improving patient care by reducing delays, enhancing hospital efficiency, optimizing resource allocation, and aiding in healthcare system planning. By analyzing TAT, hospitals can ensure timely access to care, streamline operations, allocate resources effectively, and make informed decisions for better patient outcomes and resource utilization.

About KIMS Hospital

KIMS Hospitals is a leading corporate healthcare organization in India, operating hospitals in Telangana, Andhra Pradesh, and Maharashtra. With a network of 12 hospitals and 4000 beds, we provide multi-disciplinary integrated healthcare services with a focus on tertiary and quaternary care. Our hospitals are equipped with state-of-the-art infrastructure, including operating rooms, NICUs, PICUs, and SICUs, catering to a wide range of specialties. Sunshine Hospital, a branch of KIMS, is Asia's second-largest orthopaedic hospital. Established in 2009, our hospitals prioritize clinical excellence, patient safety, affordability, and a patient-centric approach. We have received accreditations from NABH, NABL, and ISO, and our commitment to high-quality healthcare has been acknowledged with numerous accolades. At KIMS Hospitals, we strive to deliver exceptional care and continually improve our services to meet the needs of our patients.

BED ALLOTMENT TURN AROUND TIME

- The time it takes for a hospital or healthcare facility to assign a bed to a patient after receiving an admission request or when a bed becomes available is referred to as the bed allotment turnaroundtime. It is an important parameter that affects how efficiently patients move through the hospital and how well everything runs.
- The goal of bed allocation turnaround time is to speed up the process of allocating beds, cut down on delays, and guarantee that patients have prompt access to the care they need.
- Effective bed management is essential for providing patients with high-quality treatment, particularly during times of high demand or in emergency situations. Hospitals may maximize resource use, raise patient happiness, and increase overall operational effectiveness by cutting down on the time it takes to assign beds.

❖ The speed of the bed allocation process is crucial at KIMS Hospital. Here are some primary justifications emphasising its significance:

- Effective Patient movement: Appropriate bed allocation guarantees efficient patient movement throughout the hospital. When beds are assigned quickly after a patient is admitted or discharged, it helps to maintain a stable patient flow, lowering traffic in emergency rooms, decreasing the possibility of backups and delays in patient transfers, and enhancing overall hospital efficiency.
- Timely Patient Care: The turnaround time for bed allocation directly affects how quickly patients receive care. Patients may wait for extended periods of time in emergency rooms or other units when bed allocation is delayed, which could impair patient care and cause discomfort. Patients can obtain the required care and treatment quickly when the turnaround time for bed allocation is reduced, which enhances their general experience and results.

- Improved Bed Utilisation: Speedy bed allocation turnaround time facilitates improved bed utilisation. The effective and efficient use of beds is ensured through rapid bed allocation, which helps maximise bed turnover and occupancy rates. More patients may be accommodated thanks to this bed resource optimisation, which also enhances hospital capacity management by lowering the possibility of bed shortages.
- Effective Resource Allocation: The turnaround time for bed allocation gives important information for resource planning and allocation. Hospital administrators and bed management teams can spot bottlenecks, inefficiencies, and areas for development by tracking and analysing the time it takes to assign beds. To ensure efficient bed management, this information aids in strategic decision-making, resource allocation, and process optimisation.
- Patient Satisfaction: A quick turnaround time for bed allocations helps patients have a good experience. Patients feel shorter wait times and a sensation of receiving rapid care when beds are assigned to them soon. As a result, more patients are satisfied, which boosts the hospital's reputation and gets great patient feedback(2).
- Effective Communication and Coordination: Effective communication and coordination between the hospital's many departments, including the emergency room, admissions, bed management, and nursing units, are essential for efficient bed allocation. Focusing on reducing the turnaround time for bed allocation calls for streamlining communication channels and boosting collaboration across various departments, which improves hospital teamwork and communication overall.

HIMS

Patient management, appointment scheduling, electronic health records, billing and financial administration, inventory management, and bed management are just a few of the modules and features that are often included in HIMS software. A HIMS software's bed management module is created to make effective bed tracking, allocation, and availability monitoring possible.

A HIMS programme offer the following functions in the context of bed allocation:

- Real-Time Bed Availability: The software should be able to track and show information about the availability of beds in real-time, including vacant beds, occupied beds, and beds that are being cleaned or maintained.
- Bed Reservation and Allocation: Based on elements including patient acuity, specialist requirements, and bed availability, the system should enable healthcare clinicians or bed management staff to reserve and allocate beds for incoming patients.
- Updates to Bed Status: Staff members should be able to update the status of beds, such as clean, occupied, discharged, or awaiting cleaning, using the software to ensure accurate and current data for effective bed allocation.
- Reporting and analytics: The HIMS software may include reporting and analytics features to produce insights on bed utilisation, turnaround times, occupancy rates, and other critical performance metrics, assisting in the process optimisation and resource optimisation(4).

ROOMS	TOTAL NO. OF BEDS
Diwakar wing	9
Corporate	10
General ward	8
Triple sharing	18
Annapareddy	22
Surya second ward	22
Kurra wing	4
Spanada	13
Prerana	10
Dr.SS wing	10
Sahana wing	14
SICU	20
CTIC	18(4 ISOLATION)
KTU	4
MICU	10
HDU	11
NICU	10
INCU	10
SURGICAL ICU	20
STEP DOWN ICU	7
CORPORATE WARD (M)	10
CORPORATE WARD (F)	7
SURYA POST CATH	9
BHAVANAN	8
CARDIO	20
RESEVE	45
TOTAL	350

Table 1.1 (List of ward and total number of beds)

Room Categories

- Emergency Ward
- Day Care
- General
- Twin Sharing
- Single
- Deluxe
- Suite
- Presidential Suite
- ICU (ICCU/CTICU/MICU/SICU/PICU/NICU/Pre Op/Post OP/Pre Angio/Post Angio)
- Step Down ICU

AMENITIES	GENERAL WARD	TWIN SHARING	SINGLE	DELUXE	SUITE	PREMIER SUITE
BEDS	3 with curtain in between	2 with semi partition	1	1	1	1
CENTRALLY AC	✓	✓	✓	Yes	Yes	Yes
ATTACHED TOILETS AND BATHROOMS	Common	Common	✓	Yes	Yes	Yes
PATIENT COT	Manually operated	Fully automated motorized	Fully automated motorized	Fully automated motorized	Fully automated motorized	Fully automated motorized
CARDIAC TABLE	✓	✓	✓	✓	✓	✓
BEDSIDE LOCKER	✓	✓	✓	✓	✓	✓
PHONE FOR EACH BED	✓	✓	✓	✓	✓	✓
ATTANDANT COUCH	×	✓	✓	✓	✓	✓
LED TV WITH CABLE CONNECTION	× Or sharing	✓	✓	✓	✓	✓
WiFi	×	×	✓	✓	✓	✓
TEA POY	×	×	×			
SOFA SET	×	×	No	3 pieces	3 pieces	5 pieces
ATTACHED PANTRY WITH MINI REFRIGERATOR ANDMICROWAVE OVEN	×	×	×	×	✓	✓

Table 1.3 (Room amenities)

CHAPTER 2

REVIEW OF LITERATURE

Authors	Title	Objective	Methodology	Results
Thomas A Hegland , Pamela L Owens , Thomas M Selden[vi]	New evidence on geographic disparities in United States hospital capacity	To characterize the quantity and quality of hospital capacity across the United States.	All data are derived from pre-existing sources. All hospitals and zip codes in states, including the District of Columbia, contributing complete data to HCUP in 2017 are included.	Lower hospital care quality and resource intensity contribute to disparities in healthcare outcomes among racial, ethnic, and income groups. The study proposes a new method to measure local hospital capacity, accounting for patient movement across service areas. This adjustment prevents underestimation of resources in rural areas and overestimation in areas with higher non-Hispanic Black populations.
Neil A Halpern [vii], Stephen M Pastores, Howard T Thaler, Robert J Greenstein	Changes in critical care beds and occupancy in the United States	To determine the relationship between hospital size and changes	A 16-yr (1985 to 2000) retrospective analysis was	The study finds that critical care medicine (CCM) bed

	1985-2000: Differences attributable to hospital size	in the number of critical care medicine (CCM) beds, proportion of hospital beds allocated to CCM, and CCM occupancy in acute care hospitals in the United States from 1985 to 2000.	performed using the Hospital Cost Report Information System (Centers for Medicare and Medicaid Services, Baltimore, MD) on U.S. acute care hospitals that provided CCM. Hospitals were stratified into four groups (small, 1-100 beds; medium, 101-300 beds; large 301-500 beds; and extra large, >500 beds).	numbers are increasing while non-CCM bed numbers are decreasing across hospitals of all sizes. Although smaller hospitals show a higher percentage increase in CCM bed capacity, larger hospitals still have a greater allocation of beds for critical care. Moreover, larger institutions also have higher CCM bed occupancy rates. These findings can inform the development of benchmarking standards and guidelines for CCM based on hospital size.
F Soroush , B Nabilou , A Faramarzi , H Yusefzadeh[viii]	A study of the evacuation and allocation of hospital beds during the Covid-19 epidemic: a case study in Iran	to address the challenge of resource shortage, specifically hospital beds, during times of	calculating the number of excess beds using the Data Envelopment Analysis (DEA) method and the	Data Envelopment Analysis (DEA) method is effective in resource allocation

		crisis, such as the COVID-19 pandemic. The study aims to develop a suitable model for the optimal allocation of beds in different hospital wards. The researchers utilize the Data Envelopment Analysis (DEA) method to analyze the evacuation and allocation of hospital beds during the pandemic. The ultimate goal is to contribute to effective planning and strategies for combating the spread of the COVID-19 virus.	Deap2.1 software. The technical efficiency of hospitals was measured to determine the excess bed capacity. The excess beds were then considered for reallocation to COVID-19 patients based on the types of hospital wards. Inefficient hospitals with excess beds in various wards were identified, which could be utilized for COVID-19 patients with more severe symptoms. The study likely involved data collection from hospitals, applying the DEA method to analyze efficiency, and using the software for calculations and identification of inefficient hospitals with excess bed	within hospitals. By considering the type of hospital wards and the health condition of patients, the DEA method can assist policymakers in identifying hospitals with untapped potential but fewer emergency services. This information can be utilized for reallocating resources, thereby mitigating the severe impact of crises on healthcare resources. Ultimately, the study highlights the potential of the DEA method to aid in optimizing resource allocation and addressing the challenges posed by healthcare crises.

			capacity.	
Hamza, Yasser Kazzaz, Ali Alshehri, Mohannad Antar1, OusaimaAlhamouieh4, Zahra Hasan, Khaled Al-Surimi[ix]	Reducing unnecessary delays during the transfer of patients from the paediatric intensive care unit to the general ward: a quality improvement project	To improve the timeliness of transferring patients from the pediatricintensive care unit (PICU) to the general ward while ensuring patient safety. The study recognizes that delaying the discharge of PICU patients leads to increased occupancy rates and costs. Therefore, the researchers aim to investigate the process of patient transfers from the PICU and identify ways to enhance the efficiency of this process without compromising patient safety. The ultimate goal is to reduce delays in patient transfers and optimize resource utilization in the hospital.	They likely collected data on patient transfers, occupancy rates, and costs. The study may have involved analyzing the factors contributing to delays in patient transfers and exploring potential solutions to expedite the process. The researchers likely used a combination of quantitative analysis and qualitative assessments to evaluate the current system and propose strategies to optimize resource utilization and reduce delays in patient transfers while maintaining patient safety.	The study found that delays in the process of transferring patients from the pediatric intensive care unit (PICU) to the general ward can be reduced by implementing early evaluation, timely team communication, and proper preparation. The researchers recommend that all personnel involved in the transfer process pay closer attention to each step, starting from the clinical decision to the physical transfer, in order to avoid unnecessary delays. They also suggest that standardizing transfer processes may lead to a

				decrease in the length of stay in the PICU.
Seung-Chul Kim , Ira Horowitz , Karl K Young , Thomas A Buckley [x]	Flexible bed allocation and performance in the intensive care unit	to evaluate different bed-reservation schemes in an intensive care unit (ICU) of a Hong Kong hospital, with a focus on minimizing the number of cancelled surgeries for elective patients. The researchers aim to assess the trade-offs and performance measures associated with each reservation scheme using a simulation model based on historical data. Additionally, they aim to create an efficient frontier that serves as a communication tool for the ICU administrator to explain the chosen bed-allocation system and resolve potential conflicts between surgeons	It involves using round-the-clock data collected from the ICU between March and August 1995. Parameters such as admission and survival rates, arrival rates, service times, and their variances for each patient group were derived from the data. The ICU configuration was modeled as a multiple-parallel-server queuing model, assuming Poisson arrivals and exponential service times. The analysis of results compared the numbers of treated and rejected patients, highlighting the impact of increased DICU capacity on cancelled surgeries, bed utilization for OT-electives, and performance measures for	elective surgeries that can be cancelled. The study concludes that implementing bed-reservation schemes for elective-surgery patients in the ICU can help minimize the number of cancelled surgeries. However, managing ICU beds is a complex challenge with trade-offs and conflicts between different stakeholders, and there is no one-size-fits-all solution that can satisfy everyone.

		and ICU physicians.	other patient groups.	
JomonAliyas Paul PhD , Li Lin PhD †[xi]	Models for Improving Patient Throughput and Waiting at Hospital Emergency Departments	We developed a generic methodology to investigate the causes of overcrowding and to identify strategies to resolve them, and applied it in the ED of a hospital participating in the study.	Insufficient physicians during peak hours, the slow process of admitting patients to inpatient floors, and laboratory and radiology test turnaround times were identified as the causes of reduced ED throughput. Addition of a physician resulted in an almost 18% reduction in the ED Main discharged patient length of stay.	The case study results demonstrated the effectiveness of the generic methodology. The research contributions were validated through statistically significant improvements seen in patient throughput and waiting time at the hospital participating in the study.
S. Bucci , A.G. De Belvis1, S. Marventano, A.C. De Leva, M. Tanzariello, M.L. Specchia, W. Ricciardi , F. Franceschi[xii]	Emergency Department crowding and hospital bed shortage: is Lean a smart answer?	review is to synthesize the current literature on the application of Lean Thinking Principles and tools in Emergency Departments (EDs) to tackle issues such as overcrowding, long waiting times, and cost containment, with a specific focus on reducing	selecting primary studies that focused on Lean interventions and implementation in ED visits without requiring additional resources. Specific outcomes, such as length of stay, patient volume, patient satisfaction, waiting times, and diagnostic	The review included nine before-and-after studies that met the eligibility criteria. The main intervention focused on improving patient flow in the ED. The majority of the studies demonstrated improvements

		overcrowding and improving hospital admissions processes.	result waiting times, were measured. Multiple databases, including PubMed, Scopus, CINAHL, EconLit, NHS Economic Evaluation Database, Business Sources Complete, and Health Technology Assessment, were searched for relevant publications. Full-text articles were reviewed for eligibility, and discrepancies were resolved through discussion among reviewers. The selected studies underwent quality assessment using the Quality Improvement Minimum Quality Criteria Set.	in ED performance, including increased patient volume, decreased length of stay and patients left without being seen, reduced costs, and increased patient satisfaction. However, one case reported worse results in some aspects.

CHAPTER 3

METHODOLOGY

Material and Methods:

This chapter gives an outline of research methods that were followed in the study. A descriptive observational study was carried out during the period of 27 February 2023 to 27 May 2023 at a Tertiary Care hospital in Secundrabad. The data collected was secondary data only. The secondary data was collected from a software named as HIMS (Hospital Information Management System) which was used to allot the beds to the patients who needed beds within the turnaround time of 15 minutes. The sample considered was 209 based on convenience sampling. The study was carried out by recording the findings in a self-structured ER list. Data Analysis was done through advanced Microsoft Excel functions.

Study design: The data for this descriptive observational study were gathered at a certain period.

Setting: The study will be conducted in a large city's multisuper speciality hospital. The particular hospital selected will rely on its fit for the study and availability.

Study Population: Data on 209 individuals were acquired by convenience sampling for this study; these patients needed hospital transfers and bed allocations during the three-month study period. There won't be any exclusion standards, guaranteeing that every patient in need of hospitalisation is taken into account.

Tools for the Study: The Hospital Information Management System (HIMS) software will be used to collect data for the study. The programme will be used to collect data on patient flow, bed allocation turnaround time (TAT), and hospital effectiveness.

Study Period: From February 27 to May 27 of this year, a three-month study was undertaken. This period of time enables enough data gathering to evaluate bed allocation procedures and their effects on patient flow and hospital productivity.

Sample Size: The sample size for this study will include information on 209 patients who needed to be assigned beds during the designated three-month study period. Information was gathered through HIMS, a programme utilised by all of the KIMS hospital's branches. Patients in both emergencies and non-emergencies are included..

Sampling Method: Secondary data gathered from the HIMS software used for bed allocation were used in a descriptive observational study at a Tertiary Care hospital in Secundrabad. 209 patients were chosen as the study's sample size using convenience sampling. The HIMS software involved a number of processes in the bed allocation process in the hospital. Patient registration, checking the availability of beds, requesting and allocating beds based on preferences and medical conditions, assigning beds with necessary instructions, updating bed status upon occupancy and discharge, facilitating bed transfers, and providing reporting and analytics for monitoring and improvement are all part of the process. The HIMS software was essential in expediting the hospital's bed allocation procedure and maximising bed utilisation.

Procedure for Data Collection: Two secondary methods—observations and record reviews—will be used to gather data. In several hospital settings, including the emergency room and admission areas, observations will be done to evaluate the bed allocation TAT and patient flow. A record review will be done to gather information on hospital efficiency, such as patient stay lengths and bed occupancy rates.

Operational Definitions: Several important words will be operationally defined in this study. The period between making a bed request and actually allocating the bed to the patient is referred to as the bed allotment TAT. By tracking how long patients must wait to be admitted to the hospital and to receive care in the emergency room, patient flow will be evaluated. Measuring patient stay length and hospital bed occupancy rates will be used to assess the efficiency of the facility.

Data Analysis Plan: Descriptive statistics will be used to summarize the data collected on bed allotment TAT, patient flow, and hospital efficiency. Inferential statistics will be employed to evaluate the impact of delayed bed allocation on patient flow and hospital efficiency, potentially utilizing regression analysis or other appropriate statistical tests.

Ethical Considerations: The research will be done in conformity with the Declaration of Helsinki's ethical precepts. All study participants will provide informed permission, and patient confidentiality will be upheld throughout.

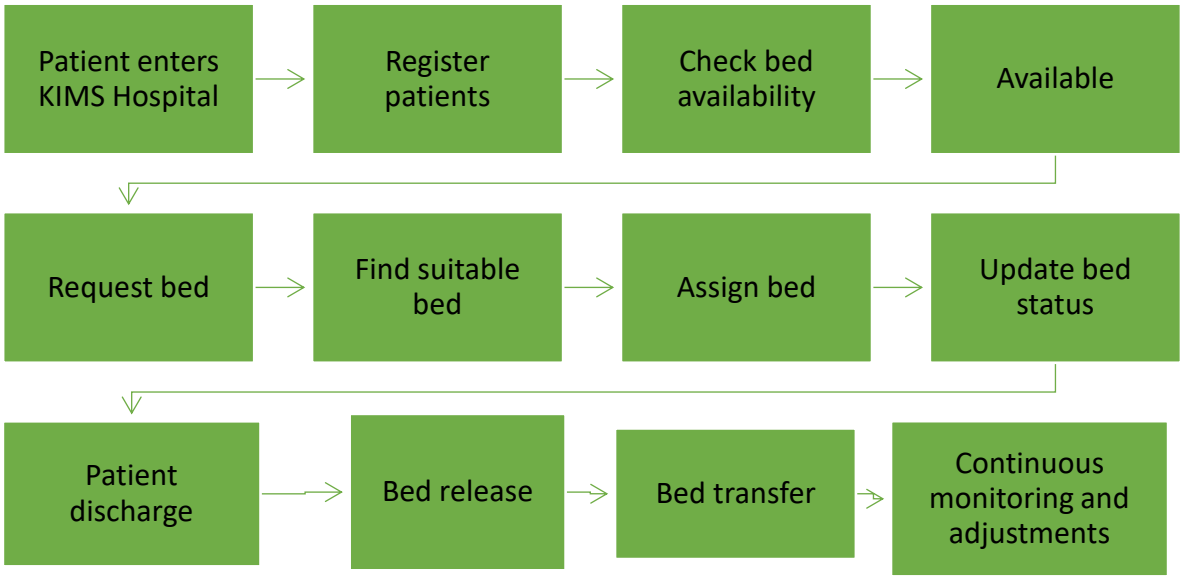
CHAPTER 4

RESULT

The study's findings are presented in this section. Its four main goals were to understand the current bed allocation procedure, calculate the hospital's current bed allotment turnaround time (TAT), assess the proportion of bed allocation delay cases based on payer type, and determine the causes of bed allocation delays.

Objective 1: To determine the hospital's process for allocating beds

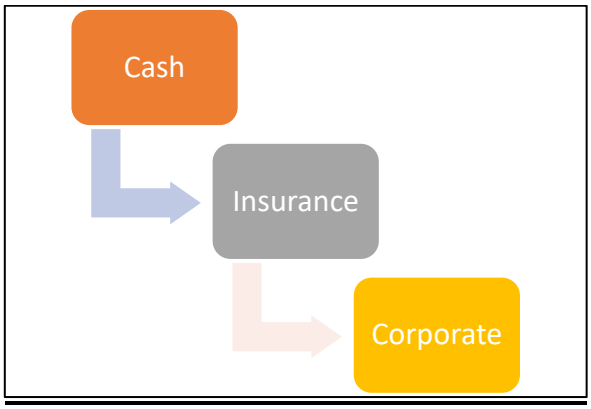
This goal was to get a thorough grasp of the steps involved in the hospital's bed distribution procedure. by looking at the order of the tasks, positions, and processes involved in assigning beds to patients. Understanding the process flow gave important insights into how bed allocation was currently managed, paving the path for streamlining and optimising the allocation process to improve patient care and operational effectiveness. To simplify the bed allocation process, the KIMS Hospital uses the HIMS (Hospital Information Management System) software.



- Registration of Patients: When a patient enters the KIMS Hospital, their data is entered into the HIMS database. These comprise identifying information, a medical history, and the cause for admission.
- Bed Availability: The HIMS software keeps up-to-date records on the number of beds that are available in the hospital's various wards and units. This covers standard beds, beds for intensive care units, speciality beds, and various kinds of lodging.

- Bed Request and Allotment: A request for a bed is made using the HIMS programme when a patient needs one. Based on the patient's medical condition, the required speciality, and the preferred room, the system looks for the availability of compatible beds.
- Bed Assignment: The HIMS programme assigns the patient a bed once a suitable one has been found. The location of the ward or unit, the bed number, and any special instructions or requirements are all included in the bed assignment.
- Updates to Status: The HIMS software changes the status of the bed, designating it as occupied and connecting it to the patient's file in question. This guarantees accurate tracking of bed availability and occupancy.
- Discharge and Bed Release: After a patient is discharged, the HIMS programme designates the bed as vacant and releases it for use by the incoming patient.
- Bed Transfer: The HIMS software streamlines the bed transfer process in the event that a patient needs to be moved from one ward or unit to another within the hospital. This guarantees smooth transfer and accurate transfer documents.
- Reporting and Analytics: To track bed utilisation, spot bottlenecks, and improve bed allocation procedures, the HIMS software offers reporting and analytics functionalities. Making wise judgements to increase general efficiency can be made easier with the aid of these insights.

Order of upgrade preference is:



Flowchart 1.1 (Order of bed upgrade preference)

1.Cash

2.Insurance

3.Corporate

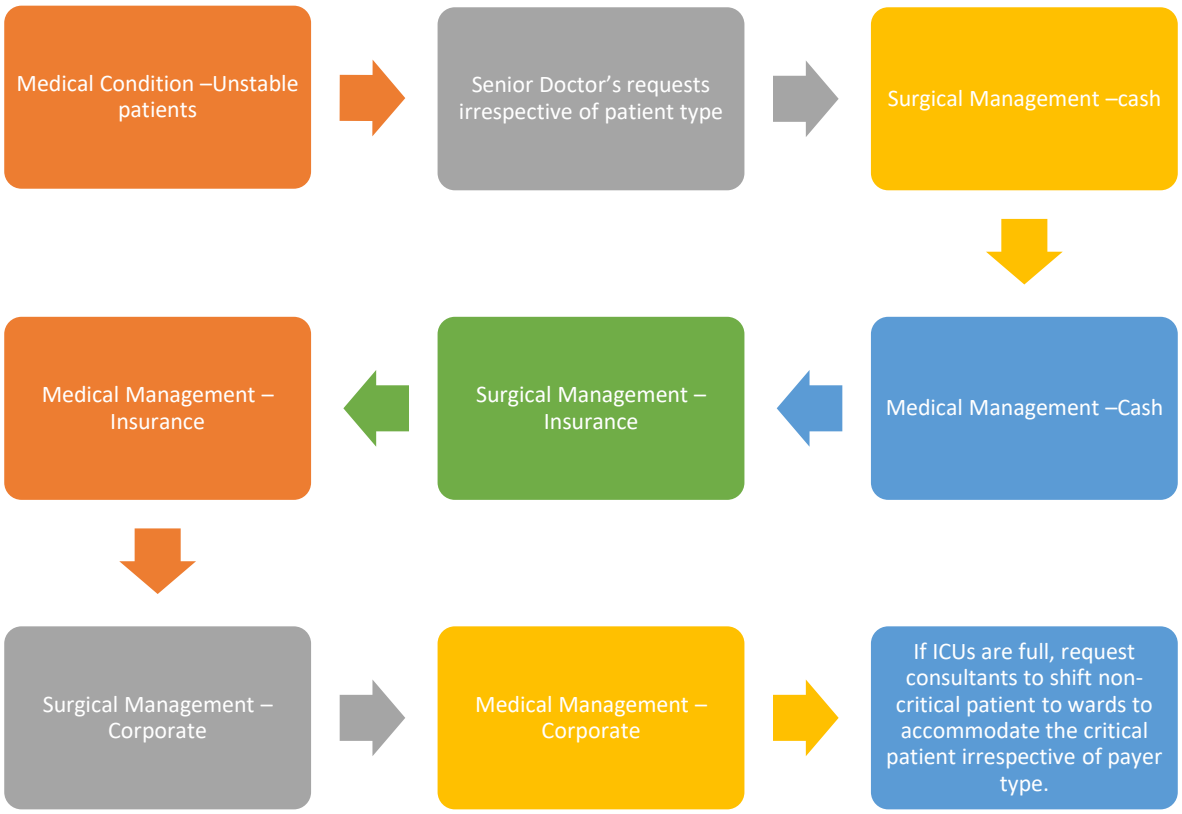
Order of downgrade preference is:

1.Corporate

2.Insurance

3.Cash

Preference for admissions / transfers



Flowchart 1.2 (Preference for admissions / transfers)

Responsibility: All admissions / transfers shall be route through Bed board managers.

Ward Transfers:

Transfers to ICUs:

The priorities for transfers to ICUs are as follows:

- MICU:

1)Ward

2)ER

3)post-op (if SICU is full)

(All admissions to ICU from lobby are routed through ER)

- SICU:

  1)Ward (if MICU is full)

  2)ER

  3)Post OP

  If SICU is not available, patient will continue inPostOP

- ICCU:

  1)ER

  2)Admission Lobby

  3)MICU (if MICU is full and a patient from ward needs to be shifted to MICU)

  4)SICU (if SICU is full and a patient from ward needs to be shifted to SICU)

Day Care:

If a patient's stay as an inpatient last up to 12 hours for a day care procedure, they will be admitted under the category of 'Day Care'. The charges for 'Day Care' are only applicable until midnight. If the patient remains in the hospital after midnight, they will be charged according to the occupied ward category.

If the patient chooses to continue staying in a ward (such as General ward, Twin, Single, or Deluxe) after the day care procedure, the corresponding ward charges will be applied based on the duration of their stay. In this case, the charges for day care do not apply(7).

Room Request (Priority allotment):

Financial Counsellors can choosea room for priority allotment based on a patient’s request. The patient can choose to wait till the room is available. In case the patient decides not to wait, he / she can opt for other available room. This is communicated clearly to the patient at the time of request.

Pre Advance:An advance amount, known as pre advance, may be collected before admission for planned surgeries (against UMR No) which will be reflected at the time of admission.

In case of Non-Availability at time of admission:

SCENARIO	ACTION	TARIFF FOR BILLING
A room is not available in the desired category	The patient shall be counselled to be admitted in a higher category room for 24 hours	Higher category room tariff for first 24 hours
Desired room not available at the time of admission- patient unwilling to pay higher room tariff	Patient stays in upgraded room until desired room is available and shifted immediately once available	Billed for desired room tariff but transferred on system to" treatedward" category
Desired room become available after 24 hours- patient wants to be shifted	Patient shifted to desired room	Billed as per the tariff of occupied room
Desired room become available after 24 hours- patient wants to retain the room	Patient continues to stay in the upgraded room- subject to availability	Billed as per the tariff of occupied room
Desired room become available after 24 hours	Patient continues to stay in the upgraded room until the desired room becomes available(5).	Billed for desired room tariff but transferred on system to" treated ward" category

Table 1.2 (Non-Availability at time of admission scenarios)

If a room in the requested category is not available, the patient will be advised to initially stay in a higher category room for 24 hours and then be transferred back to the desired category the following day. If the desired category is still not available after 24 hours, the patient will be transferred to the "Treated Ward" in the system but will continue to stay in the upgraded room until the desired room becomes available.

During this upgrade, the patient will be required to sign an undertaking stating that they are being admitted into the higher category and will be responsible for paying the corresponding ward and other relevant charges for a period of 24 hours. If the patient refuses to pay the higher category charges, they will still be admitted to the higher category room but will be charged as if they were in the "Treated Ward" from the time of admission.

If the patient chooses to continue staying in the higher category room even after the desired room becomes available, they will be charged the corresponding room rent and other relevant charges.

As a rule, patients can only be upgraded to a room one category higher than their desired room if it is not available. Any further upgrades beyond one category will be at the discretion of the Unit Head, with documentary evidence of the COO's signature on counselling forms.

The Bed Manager will monitor the availability of beds and arrange for the transfer of upgraded patients back to their desired room category.

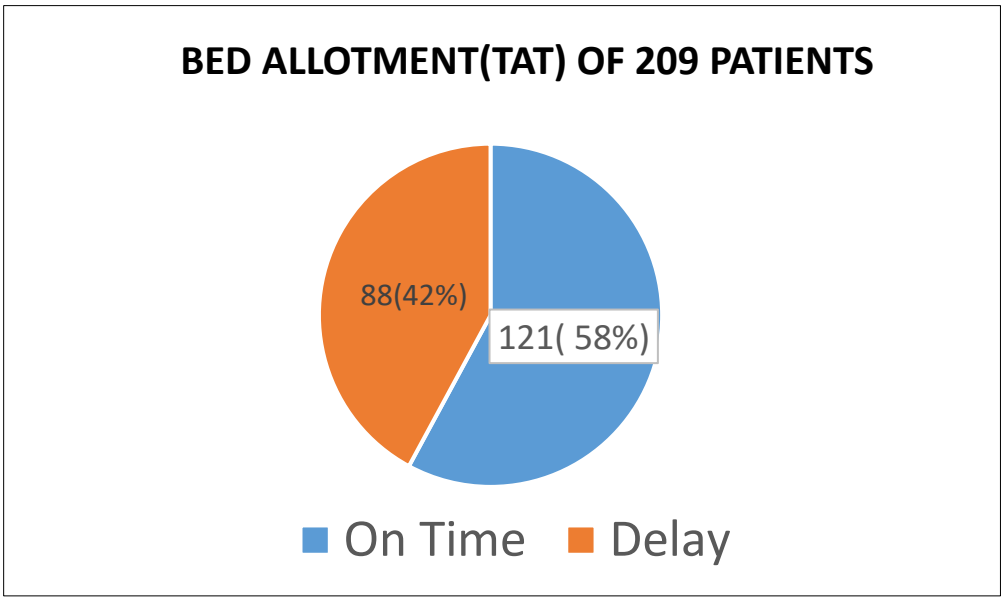
Preference for room upgrades will be given to cash patients who have been admitted more than two times in a year.

Patient can occupy an emergency bed in OP for a maximum of 4 hours after which he/ sheshallbe admitted. These charges shall be cleared on OP basis and cannot be transferred to the IP bill.

Patients can get admitted in ER as IP, upon doctor's advice (mostly for observation)

Objective 2: To estimate the current bed allotment TAT in the hospital

The second objective of this study was to estimate the current bed allotment TAT in the hospital. This objective aimed to provide a quantitative measure of the time it takes for a patient to be allocated a bed from the moment of admission. By analyzing the data related to bed allocation times, the study aimed to determine the average TAT and identify any variations or trends that may exist. The findings of this objective will help to assess the efficiency and effectiveness of the bed allocation process in the hospital.



Graph 4.1 (Bed allotment TAT)

This illustrates the sample size of 209 patients chosen through convenience sampling. The results, which were documented in a self-structured ER list, show that 88 patients—or 42% of the total number of patients—had their requests for beds delayed. However, 121 patients, or about 58% of the patients, got their allotted beds filled on time. The study found that a number of factors, including staff-related problems including slow bed cleaning, ineffective departmental coordination, and invoicing delays, were linked to delayed bed allocation. Due to their hectic schedules and the scarcity of particular bed kinds, bed board managers (BBMs) also encountered difficulties.

Objective 3 : To determine the hospital's ratio of delay cases according to payer type

The third goal was to assess the ratio of delay instances based on the hospital's payer type. This objective looked at if bed allocation delays varied depending on whether a payment was made by corporate, cash, or insurance. The goal of the study was to find any discrepancies or patterns in the bed allocation process by analysing the quantity of delayed bed assignments across various payer categories. The results of this objective would shed light on how payer type affects the effectiveness of bed allocation and assist pinpoint areas for improvement.

Payer Type (Unique List)	Count	On time	Late
Corporate	65	50	15
Cash	68	39	29
Insurance	76	32	44

Table 4.1 (Payer type vs count)

:

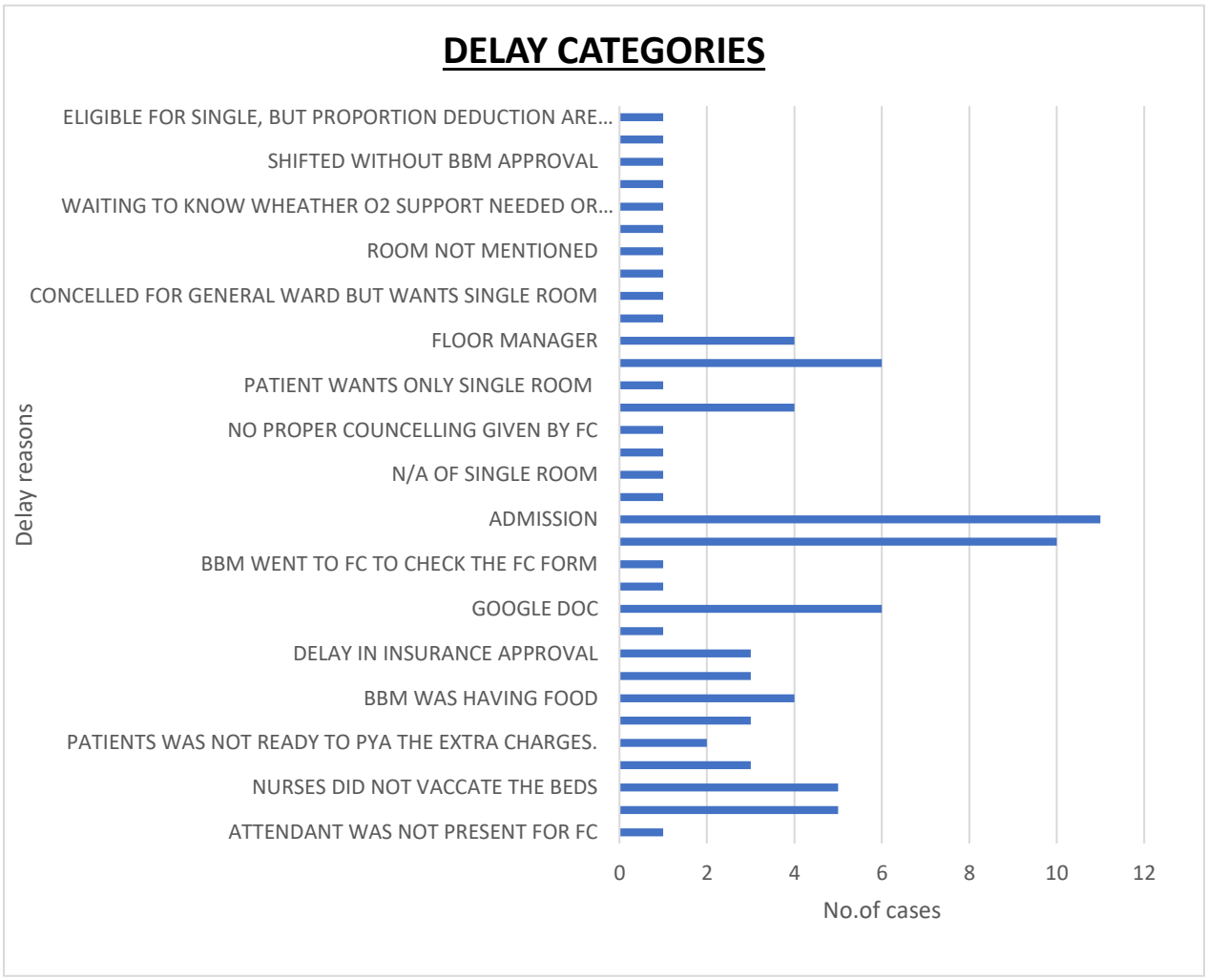
- Corporate: Of the 65 cases involving the corporate payer type, 50 had their bed allocation done promptly, while 15 had a delayed bed allocation. This shows that most corporate patients received prompt bed allocation.
- Cash: Of the 68 cases involving cash payers, 29 cases had delayed bed allocation while 39 cases had their bed allocation completed on time. In comparison to the corporate payer type, there is a higher percentage of delayed bed allocation.
- Insurance: According to the table, only 32 of the 76 cases involving insurance payer types had their bed allocation done promptly, while 44 cases had a delayed bed

allocation. This shows that there have been several delays in allocating beds to those with insurance.

Overall, the data indicates that the bed allocation TAT differs according on the kind of payer. While insurance patients typically face the highest percentage of delayed bed allocation, corporate patients typically have the best rate of timely bed allocation. To increase overall hospital efficiency and patient happiness, this information can be used to pinpoint places where the bed allocation procedure needs to be improved, especially for patients with insurance coverage.

Objective 4 : To evaluate the reasons for delay in bed allotment

Examining the causes of bed allocation delays was the third goal. In order to achieve this goal, it was necessary to identify and analyse a variety of factors that contributed to the delays, including staff-related problems, difficulties faced by Bed Board Managers (BBMs), and attendant and patient preferences. The goal of the study was to provide a thorough analysis of the obstacles and bottlenecks in the bed allocation process by figuring out the underlying causes of the delays. The results of this objective would be helpful in creating plans and actions to deal with these problems and increase the effectiveness of bed distribution in the hospital.



Graph 4.2 (Delay category per cases)

Here is an interpretation of the many variables causing delays in the bed allocation procedure based on the data of delay reasons:

- Attendant was not present for FC: In one case, the attendant who was supposed to go for financial counselling was not available, which led to a delay in the bed allocation process. Doctor wanted the patient to be shifted to the ward that he was not eligible for, because of which it was needed that the attendant of the patient should go for re counselling.
- Beds not released from housekeeping: In five cases, delays occurred because the beds were still being cleaned by the housekeeping staff and were not available for allocation and even if the cleaning has been done on the time, beds were not released on the system from housekeeping.
- Nurses did not vacate the beds: Five cases experienced delays because the nursing staff did not vacate the beds on time, causing a delay in the availability of beds for new patients.
- Non-availability of general ward: In three cases, delays occurred due to the unavailability of general ward beds, which impacted the allocation process.

- Patient was not ready to pay the extra charges: In two cases, delays occurred because the patient or their attendant were not willing to pay the additional charges associated with the extra charges which the attendant are supposed to pay for the room when the patients are shifted to SICU.
- Attendant went for FC: In three cases, delays occurred because the attendant responsible for the bed allocation process went for financial counselling, causing a delay in the overall process.
- BBM was having food: Four cases experienced delays because the Bed Board Manager (BBM) responsible for bed allocation was unavailable due to mealtime.
- Pending decision: In three cases, delays occurred due to pending decisions related to bed allocation, possibly requiring further assessment or clarification.
- Delay in insurance approval: In three cases, delays occurred because insurance approvals for bed allocation were not received in a timely manner.
- CC doctor asked not to shift: In one case, the Critical Care doctor requested not to shift the patient, which led to a delay in bed allocation.
- Google Doc: Six cases experienced delays related to the use of Google Docs for bed allocation, indicating possible issues or inefficiencies with the system.

CHAPTER 5

DISCUSSION

The findings of this study provide crucial new insights into what delays bed allocation in a hospital setting. The identified components can be largely categorised into staff-related concerns, attendant and patient preferences, and BBM issues. Understanding these factors is crucial for developing strategies to improve patient satisfaction and bed allocation effectiveness.

Staff-related delays' causes:

It was found that the delays in bed allocation were caused by a number of staff-related issues. Insufficient bed cleaning by housekeeping, insufficient financial counselling by financial counsellors (FCs), insufficient billing, insufficient promptness from floor managers in asking the attendant to leave the bed, insufficient room fumigation issues, insufficient communication from the nursing station about bed openings, insufficient financial counselling by FCs, and unauthorised patient shifting without BBM's approval were some of these. These findings demonstrate the necessity for improved staff cooperation and communication, standardised bed cleaning and fumigation techniques, and efficient billing systems to decrease bed allocation delays.

BBM-caused delays:

The study also identified a number of challenges that Bed Board Managers (BBMs) had to overcome that resulted in delays in the distribution of beds. It was found that contributing factors included BBMs being preoccupied with the admissions process, performing rounds or inspections, relying on manual systems like Google sheets for bed distribution, taking dinner breaks, verifying FC papers, and the absence of general wards, solitary rooms, and female beds. It is vital to improve BBM schedules, implement digital bed allocation systems, and address bed shortages in certain categories in order to ensure efficient and fast bed allocation.

Attendant and patient-related reasons for delay:

Delays in bed allocation were found to be influenced by attendant and patient preferences.. Patient preferences for specific rooms at particular times, unwillingness to shift to different rooms when preferred ones are not available, attendant's reluctance to pay extra charges for higher-cost rooms, challenges in convincing patients to shift from single rooms to twin sharing, attendant's desire to personally inspect rooms before deciding, requesting room changes during financial counseling, attendant's absence during financial counseling, pending decisions from the attendant's side, and waiting for transportation arrangements were identified as factors causing delays. In order to resolve these problems, it is necessary to manage patient expectations during the bed allocation process and to communicate clearly about the options that are accessible.

Analysis of payer categories:

The examination of payer types found variances in the timeliness of bed distribution. Cash and insurance payer categories faced larger delays than corporate payer types, which had a higher percentage of on-time bed allocations. This data raises the possibility that each payer type may have

different processes or resource allocations that affect the effectiveness of bed allocation. To determine the underlying causes of these variances and create solutions, more research is required.

Overall, this study offers insightful information on the elements causing delays in bed allocation. The results emphasise the significance of dealing with staff-related difficulties, improving BBM procedures, and successfully managing attendant and patient preferences. By implementing protocols to address these issues, hospitals can improve the overall patient experience, improve the efficiency of bed distribution, and reduce delays.

CHAPTER-6

CONCLUSION

The current study set out to examine the bed allocation turnaround time (TAT) at KIMS Hospital, estimate the incidence of delay cases based on payer type, and determine the causes of bed allocation delays. The results shed light on the existing status of bed distribution and offer insightful advice for enhancing the effectiveness and efficiency of the procedure.

The study found that 88 out of the 209 patients in the sample, or about 42% of the patients, had delays in receiving their assigned bed. On the other side, 121 patients, or about 58% of the patients, had their bed allotment completed promptly. This suggests that there is potential for improvement in the hospital's efforts to cut down on bed allocation delays.

The corporate payer type had the highest rate of timely bed allocation, with 50 out of 65 instances receiving beds on time, according to an analysis of the data by payer type. Only 32 out of 76 instances for insurance payers had beds allocated promptly, which was the greatest percentage of delayed bed allotment. These results indicate that payment type can affect the effectiveness of bed allocation, and in order to ensure timely bed allocation for all patients, efforts should be made to solve the issues posed by various payer types.

The study also found a number of characteristics that affect how quickly beds are allocated. The process of allocating beds was found to be impacted by staff-related problems such as sluggish bed cleaning, poor departmental coordination, delayed billing, and difficulties faced by Bed Board Managers (BBMs). Delays were also caused by staff and patient preferences, such as requests for specific rooms, unwillingness to pay additional fees, and delayed decisions. These results emphasise the need for better staff collaboration and communication, standardised bed cleaning and fumigation procedures, optimised BBM schedules, and efficient attendant and patient expectation management.

There are various suggestions that can be made to resolve these problems and increase the effectiveness of bed allocation. Digital bed allocation solutions can automate the procedure and minimise human error. Timely bed preparation can be ensured by standardising processes for bed cleaning, fumigation, and availability. Enhancing staff communication and training can speed up departmental collaboration and decrease delays. In order to manage preferences and promote more efficient bed allocation, clear and effective communication with attendants and patients about the available options, costs, and expectations is essential. Regular monitoring and feedback systems can aid in locating bottlenecks and enhancing the bed allocation procedure regularly.(2).

It is critical to recognise the limitations of this study. Convenience sampling and the small sample size may have limited the findings' capacity to be generalised. Furthermore, just one hospital was used for the investigation, which may have particular characteristics that affected the findings. To

improve the generalizability of the results, future study might think about increasing the sample size, employing random sampling methods, and including additional hospitals.

In conclusion, this study offers insightful information about the selection of beds at KIMS Hospital. The results highlight the necessity of increasing the effectiveness of bed allocation, decreasing delays, and improving the overall patient experience. Hospitals may significantly enhance the bed allocation process by addressing staff-related concerns, streamlining BBM procedures, and skillfully managing attendant and patient preferences. Better health outcomes, higher patient satisfaction, and greater hospital efficiency can all be attributed to these changes.

CHAPTER-7

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