# Evaluating Hospital Acquired Infections (HAI) impact on inpatients at Paras Hospital


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# CONTENTS

# Introduction

Hospital-acquired infections (HAIs) are among the most pressing challenges in healthcare, contributing to increased morbidity, prolonged hospital stays, higher costs, and preventable deaths.

**Research Purpose :** To assess the burden of hospital-acquired infections (HAIs) and evaluate their impact on inpatient morbidity and mortality across critical departments in a tertiary care setting.

**Research Question**

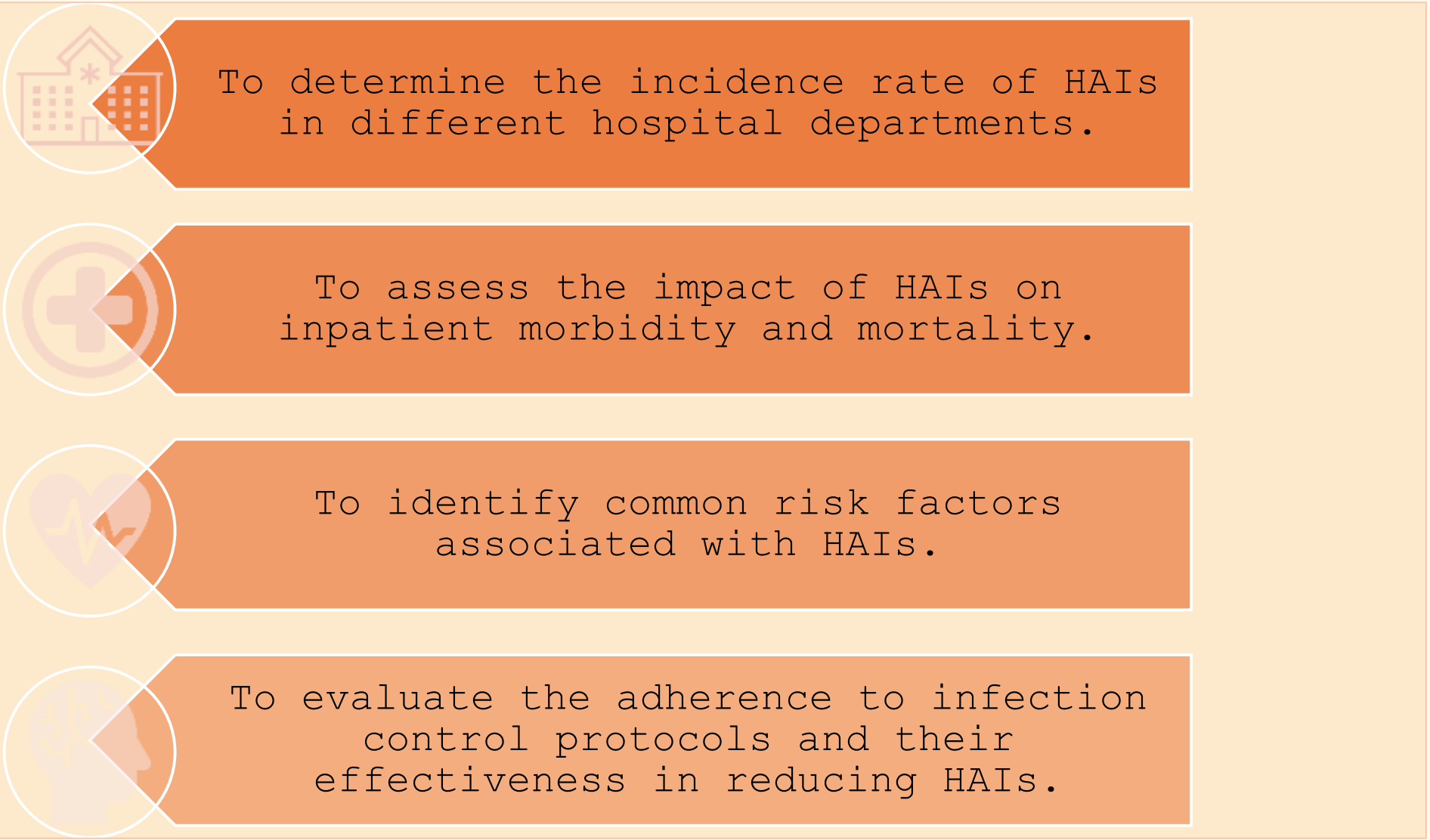
What is the prevalence of hospital-acquired infections at Paras Hospital, and how do HAIs impact inpatient morbidity and mortality rates?

# Rationale of the Study

- This data is essential for quality improvement, particularly in monitoring preventable conditions like HAIs.
- Hospital-Acquired Infections (HAIs) such as VAP, CAUTI, BSI, and SSI often occurs after 72 hours of admission and significantly affect patient outcomes.
- HAIs increase hospital stay duration, cost of care, and mortality, thereby undermining hospital performance and patient safety.
- Paras Hospital, being a tertiary care setting, serves as a suitable institution to analyze the prevalence, risk factors, and outcomes of HAIs using retrospective study.
- The goal is to generate actionable insights that

# Aim And Objective

To evaluate hospital-acquired infections and their impact on inpatient morbidity and mortality at Paras Hospital.



# Methodology

## Research Design:

Descriptive cross-sectional record-based review study, using patient records and data collected over a 6-month period to evaluate trends, associations, and outcomes related to HAIs.

## Study Setting:

The study was conducted at Paras Hospital, Gurugram a tertiary care multispecialty hospital

## Study Population

**Inclusion Criteria:**

- Patients admitted to the hospital for more than 72 hours.
- Patients diagnosed with a hospital-acquired infection.
- Inpatients admitted in ICU department ,Urology department , OT department, Oncology department.

**Exclusion Criteria:**

- Patients who are presented with an infection at the time of admission.
- Patients discharged or transferred before 72 hours of admission.

# Methodology

**Study Approach:**

The study uses a quantitative approach, relying on retrospective data analysis from patient records. The following components were analyzed:

- Type of HAI (e.g., CAUTI, SSI, VAP, BSI)
- Age wise distribution
- Department-wise incidence
- Length of hospital stay
- Morbidity indicators
- Mortality outcomes No qualitative interviews or surveys were conducted.

**Sample Size:**

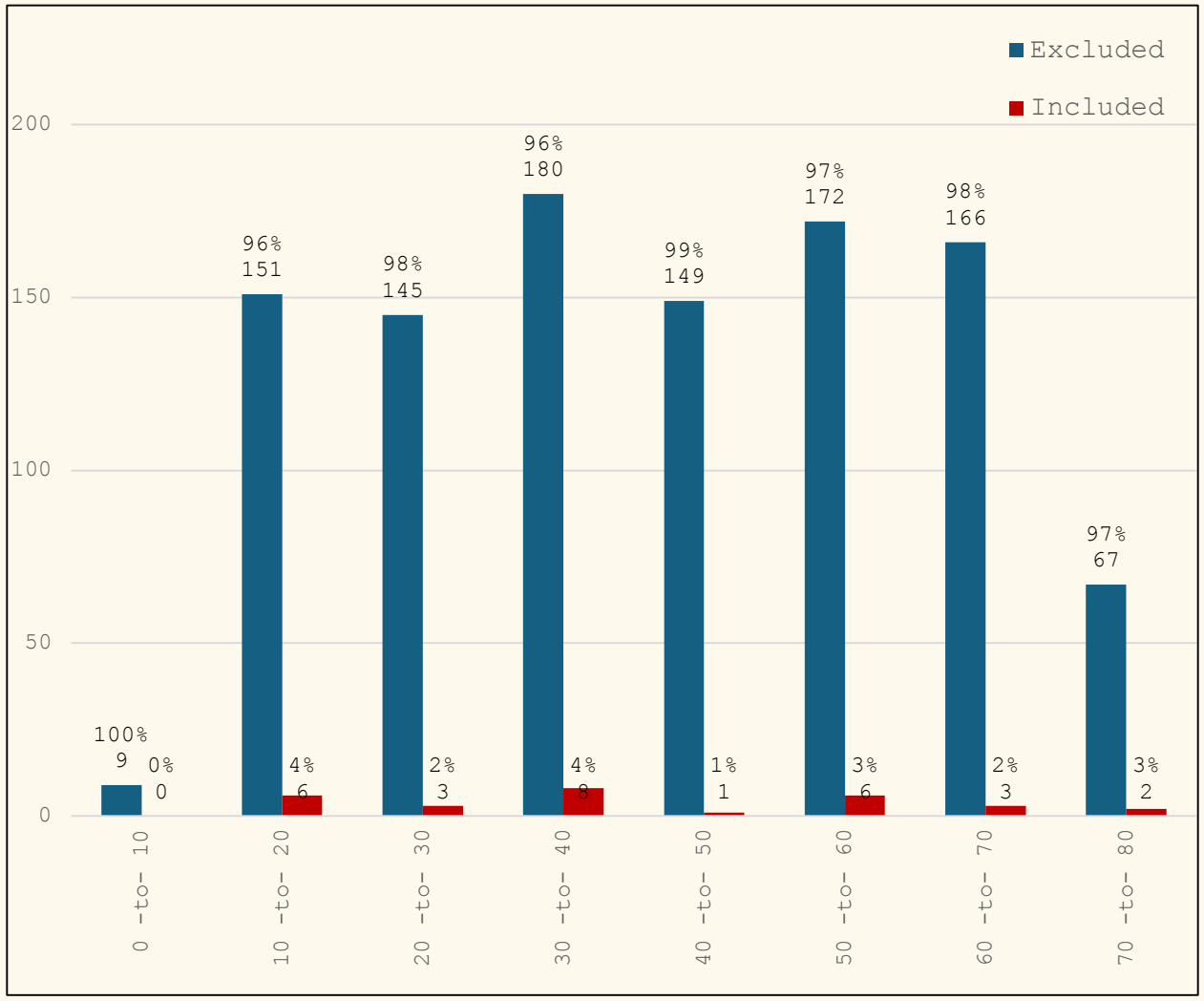
A total of 1068 HAI patients were included in the study

**Study Instrument:**

- Electronic Medical Records (EMRs)
- Infection Control Department reports

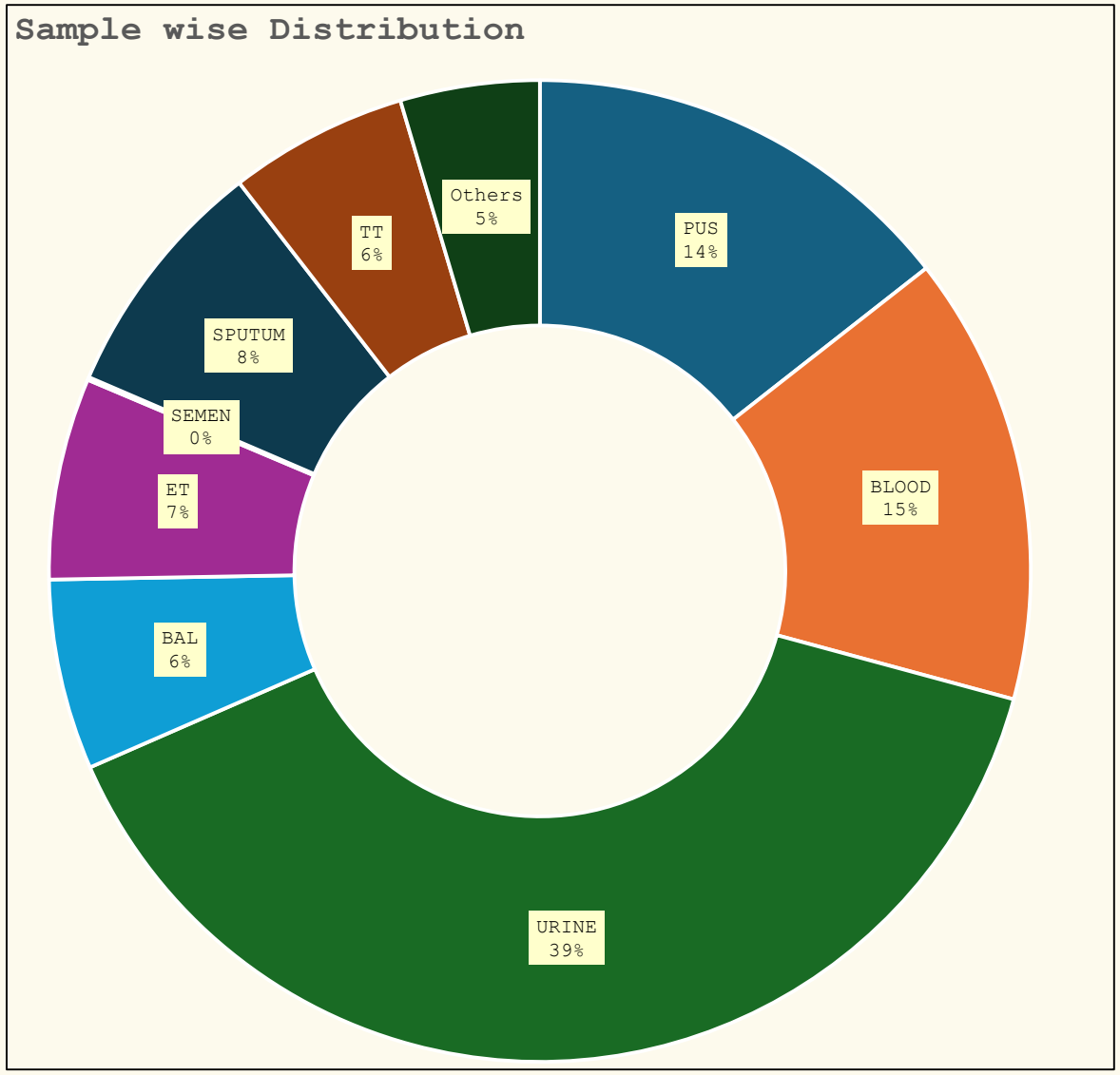
# Results

## Age wise Distribution of Sample



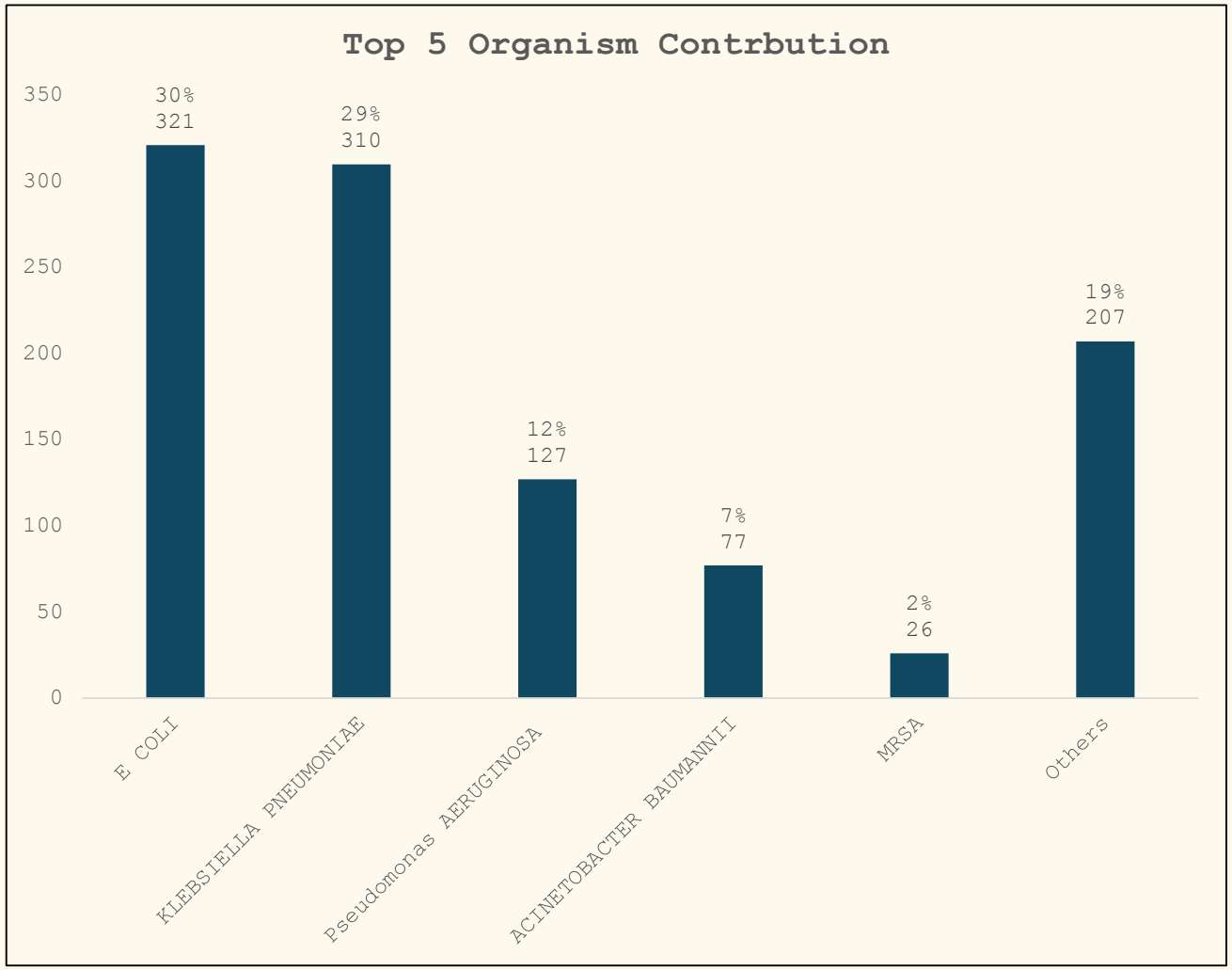

- 30–40 age group had the highest number of total cases (180).
  - Inclusion rate: 4%
  - Exclusion rate: 96%
- 10–20 and 30–40 age groups both showed the highest inclusion rate at 4%.
- 0–10 age group had no included cases, indicating minimal exposure or lower risk of HAIs.
- Inclusion rates for other age groups remained low, ranging from 1% to 3%.
- 40–50 age group showed the highest exclusion rate of 99%.
- Middle-aged adults (30–60 years) made up the majority of HAI cases, highlighting increased vulnerability to hospital-acquired infections.

# Sample wise distribution




- Urine samples were the most collected, comprising 39% of all samples.
- Indicates high vigilance for Catheter-Associated Urinary Tract Infections (CAUTI).
- Blood samples made up 15%, supporting detection of Bloodstream Infections (BSI).
- Pus samples accounted for 14%, reflecting efforts to monitor wound and surgical site infections.
- Sputum samples contributed to 8%, relevant for detecting respiratory tract infections.
- Endotracheal (ET) samples formed 7%, commonly linked with Ventilator-Associated Pneumonia (VAP).
- Bronchoalveolar lavage (BAL) and tracheal tube (TT) samples together made up 6%, used for deeper respiratory infection diagnostics.

# Microbiological Profile: Top Organisms Identified




E. coli was the most common pathogen, accounting for 30% of isolates. Klebsiella pneumoniae followed closely at 29%.

Pseudomonas aeruginosa was the third most prevalent at 12%.

All top pathogens identified were Gram-negative bacteria, typically linked to:
Device-associated infections
Hospital-acquired (nosocomial) infections

# HAI-Specific Morbidity and Mortality Trends

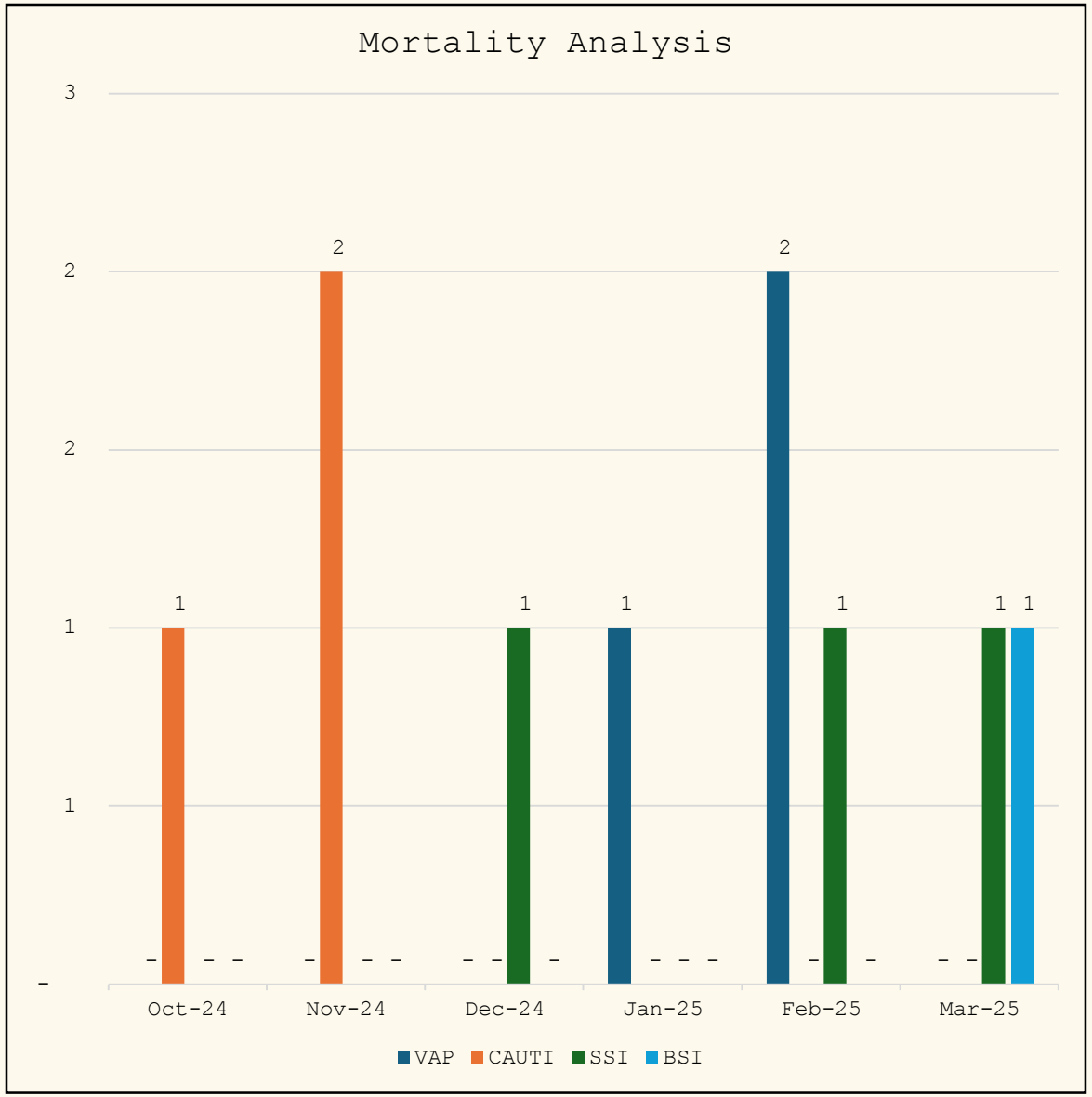
- **VAP:** Morbidity fluctuated; **highest mortality in Jan & Feb** → Possible gaps in ventilator care.

- **CAUTI:** Intermittent morbidity; **limited mortality (Oct & Nov)** → Matches high urine sample load.

- **SSI:** Morbidity stable; **isolated mortality in later months** → May indicate lapses in surgical asepsis.

- **BSI:** Mortality noted in **March** → Emerging concern.

- Overall mortality low, but morbidity trends demand stronger IPC compliance.



# Benchmark Monitoring and Performance Evaluation

| KPI | Target/ Benchmark | OCT (2024) | | NOV (2024) | | DEC (2024) | | JAN (2025) | | FEB (2025) | | MAR (2025) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VAP | 8.5(NCBI)) | 1 | 3.73 | 2 | 8.33 | 0 | 0.00 | 1 | 4.41 | 2 | 7.72 | 1 | 7.09 |
| | | 268 | | 240 | | 284 | | 227 | | 259 | | 141 | |
| SSI | 0.9 (NHSN) | 1 | 0.23 | 3 | 0.49 | 3 | 0.51 | 1 | 0.17 | 1 | 0.18 | 3 | 0.49 |
| | | 431 | | 613 | | 587 | | 576 | | 565 | | 618 | |
| BSI | 0.8(NHSN) | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.80 | 1 | 2.08 |
| | | 860 | | 590 | | 639 | | 639 | | 556 | | 481 | |
| CAUTI | 0.9 (NHSN) | 3 | 2.00 | 2 | 1.25 | 0 | 0.00 | 0 | 0.00 | 1 | 0.64 | 0 | 0.00 |
| | | 1500 | | 1595 | | 1517 | | 1604 | | 1556 | | 1057 | |

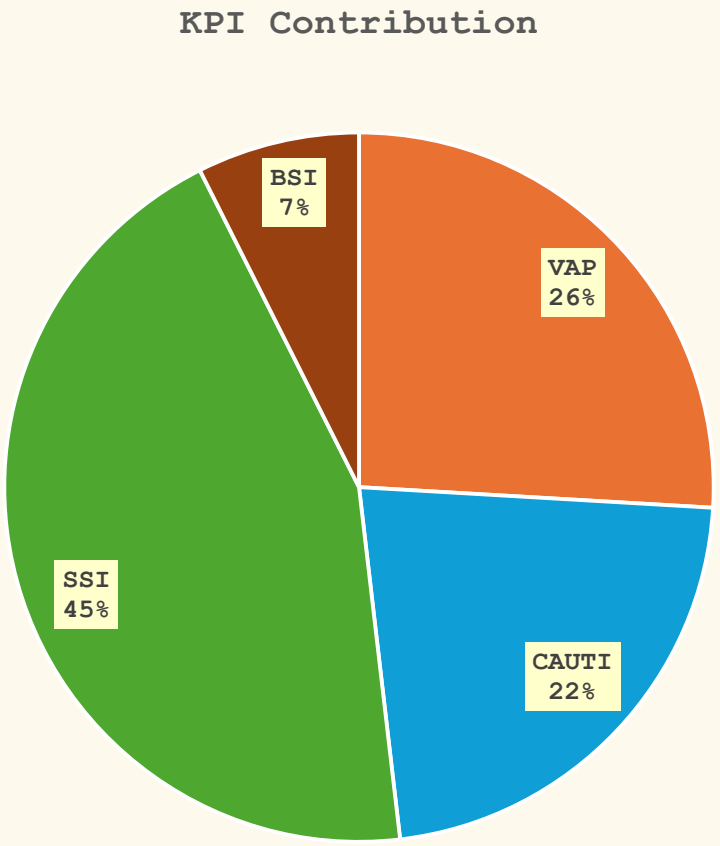
- VAP rates exceeded benchmark (8.5/1000 days) in:
  Nov (8.33), Feb (7.72), Mar (7.09) → Possible ICU overload or staffing issues.

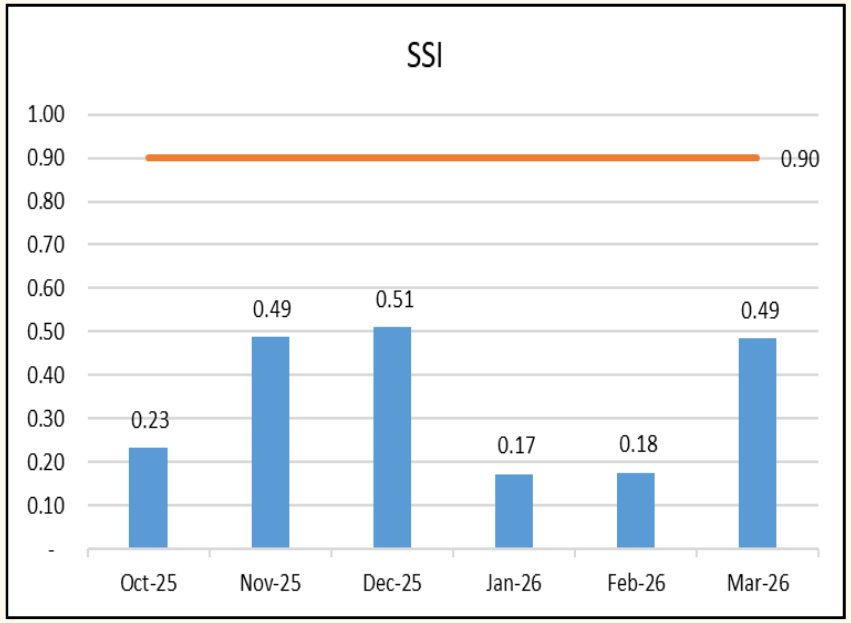
- SSI rates remained consistently below benchmark (0.9) → Indicates effective surgical site control.

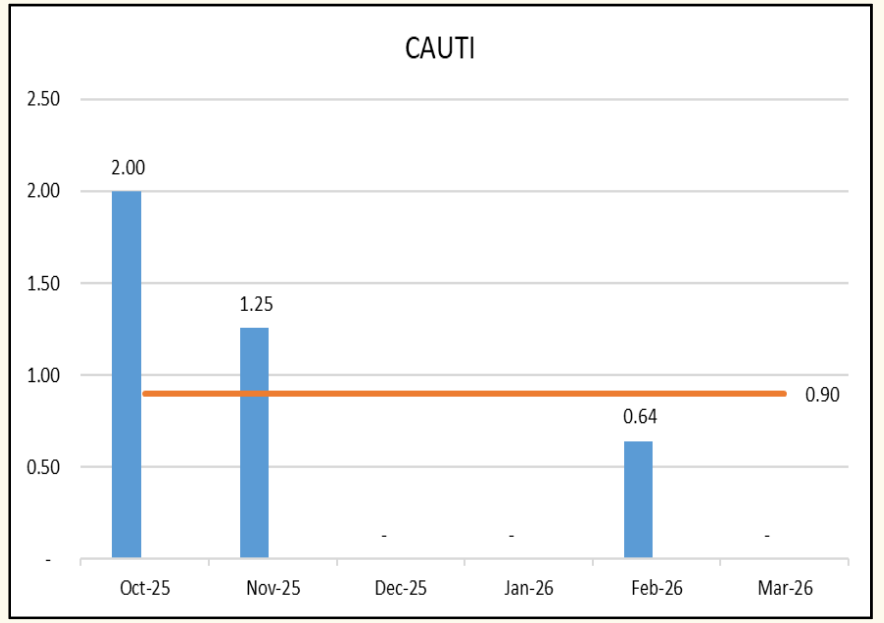
- BSI rates breached benchmark (0.8) in:
  Feb (1.8), Mar (2.08) → Points to IV line care concerns or rising patient acuity.

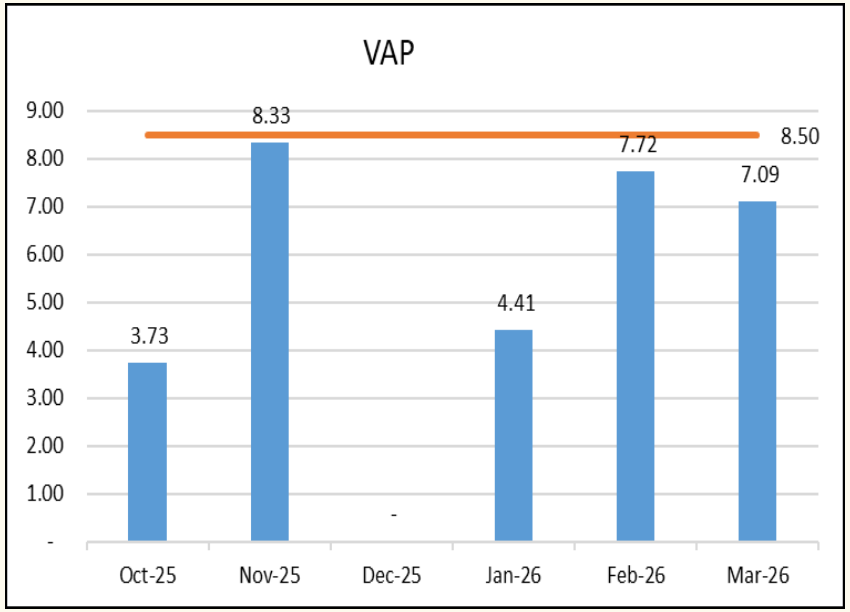
- CAUTI peaked at 2.00, surpassing the 0.9 benchmark → Signals gaps in catheter care protocols.

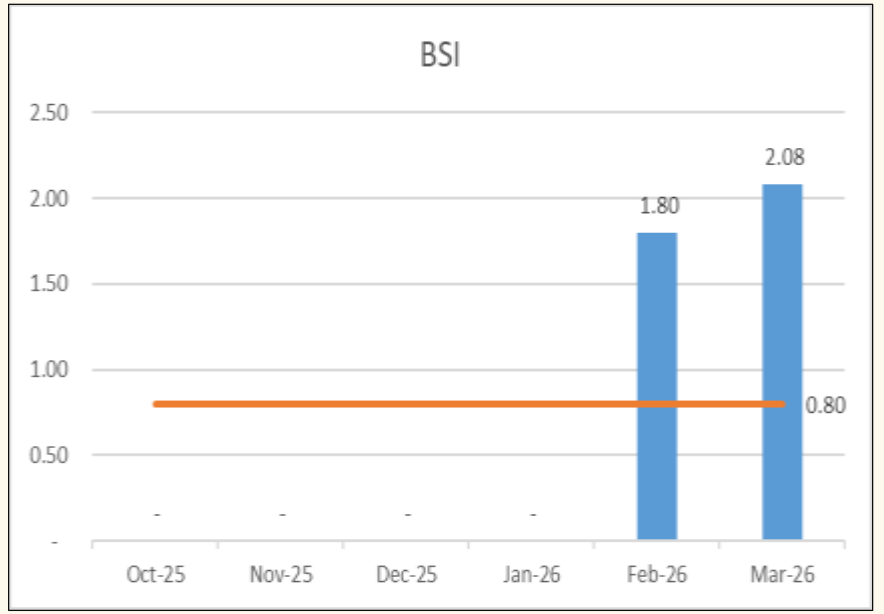
# KPI Contribution



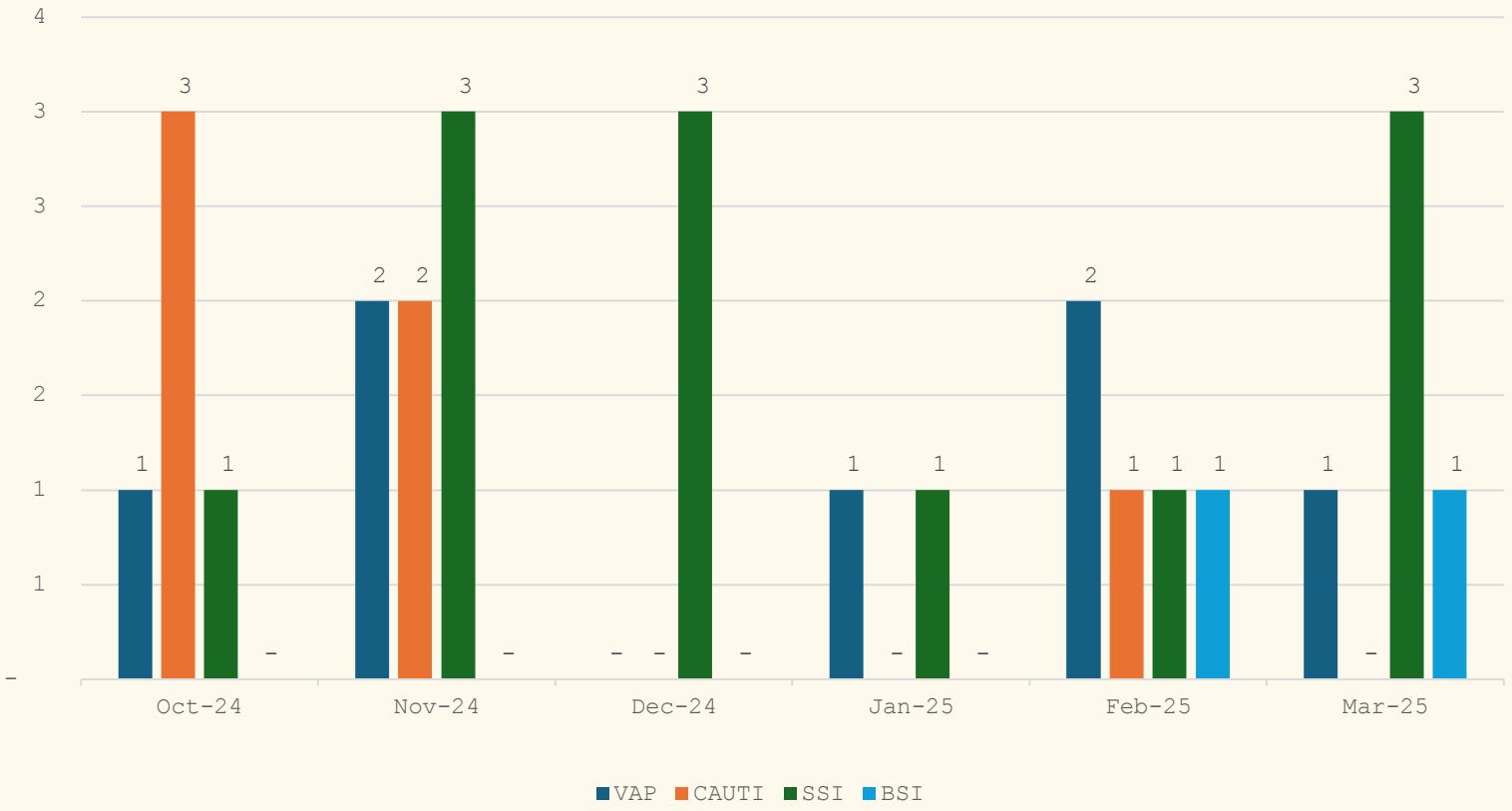



# Monthly Summary of Hospital-Acquired Infections




•VAP Present in most months
Peaks in Nov & Feb → ICU vigilance needed

•CAUTI Highest in October (3 cases)
Declined to zero in Dec, Jan, and Mar

•SSI Reported consistently
Highest in Nov & Mar (3 cases) → May link to surgical load

•BSI Appeared only in Feb & Mar

# Discussion

- In this study **4 major HAIs** are evaluated: BSI, SSI, VAP, CAUTI

- **Top pathogens** found were**:-**
  - *E. coli (30%)*,
  - *Klebsiella (29%)*,
  - *Pseudomonas (12%)*

- **Infection trends:-**
  - SSI: Well-controlled, below national benchmarks
  - VAP & BSI: Periodic spikes, exceeding benchmarks
  - CAUTI: Improved over time, but caused early mortality in some months

- **Most affected:** *Middle-aged*

- **Conclusion:-**
  - Highlights need for continuous surveillance,
  - IPC strengthening, and
  - data-driven HAI control

# Recommendations

*Based on the findings and performance gaps identified during the study, the following recommendations are proposed to enhance infection control practices and patient safety:*

- Implement Real-Time Electronic Surveillance Systems
- Conduct Routine Compliance Audits
- Department-Wise Infection Control Training
- Introducing Root Cause Analysis (RCA) for Every HAI-Linked Mortality
- Benchmarking Against National and Global Standards
- Establish a Multidisciplinary Infection Control Committee
- Patient Risk Stratification and Early Isolation

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**Thank You**

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