Hospital Resource Utilization & Patient Outcomes Dashboard

1. Problem Overview

Hospitals generate large volumes of operational and clinical data related to patients, beds, staff, and medical resources. However, much of this data is underutilized for decision-making. Inefficient resource allocation, prolonged patient stays, and uneven department workloads can negatively impact patient outcomes and hospital performance.

The objective of this project is to analyze hospital operational data and build an interactive analytics dashboard that helps administrators monitor patient admissions, track resource utilization, and improve patient outcomes.

2. Data Description

The dataset is stored in a MySQL database named hospital_analytics and consists of multiple relational tables with more than five columns and over fifty records.

Tables include Patients, Admissions, Beds, Resources, and Staff, covering demographic data, admission details, bed availability, equipment usage, and staff availability.

3. Metrics Definition

Key metrics include Average Length of Stay (ALOS), Bed Occupancy Rate, Admission Volume, Discharge Outcomes, and Resource Utilization Rate. These metrics help measure hospital efficiency and patient care quality.

4. Analysis & Visualizations

Data analysis was performed using Python and SQL. Dashboards were created using Power BI/Tableau with line charts, bar charts, pie charts, and KPI cards. Filters were added for department, admission type, date range, and gender.

5. Insights

Emergency admissions are higher in critical departments such as Cardiology and Neurology. ICU bed occupancy frequently exceeds optimal levels. Elderly patients tend to have longer hospital stays.

6. Recommendations

Increase ICU capacity in high-demand departments, optimize discharge planning, reallocate underutilized resources, and improve staffing during peak periods.

7. Conclusion

This project demonstrates how data analytics and visualization can support better hospital decision-making. The developed dashboard provides actionable insights to improve operational efficiency and patient outcomes.