

Hospital Patient Record Analysis

Objective

The objective of this project is to explore and analyze synthetic hospital patient data to extract meaningful insights. This information can help hospitals run better, improve how they care for patients, and decide how to use their resources wisely.

Dataset Overview

- **Total records:** 1,000,000
- **Columns:** 25 attributes including demographics, medical history, diagnosis, treatment, billing, and hospital details.

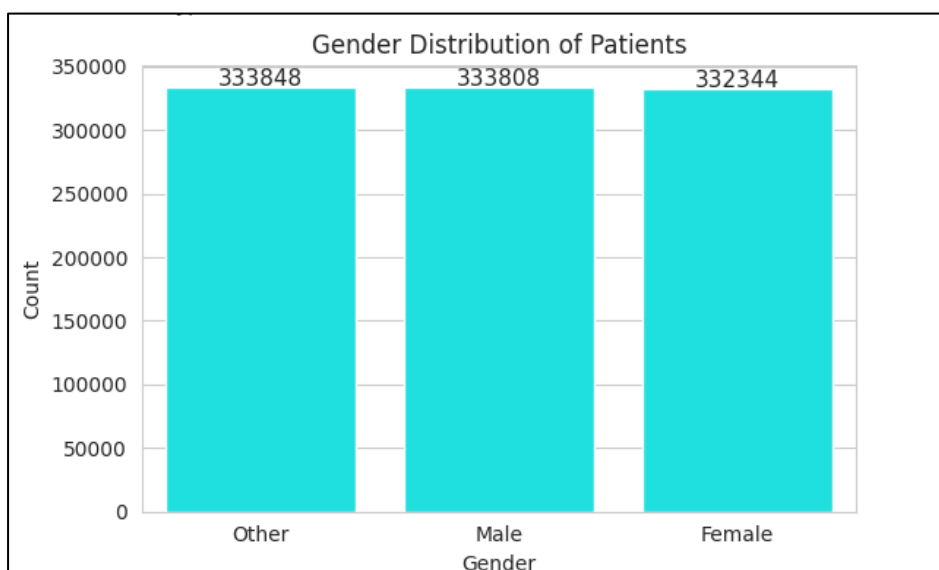
Exploratory Data Analysis (EDA)

1. Average Age of Patients

- **Average Age:** ~50.49 years
- Majority of patients fall in the middle-aged category, indicating a high demand for chronic illness management.

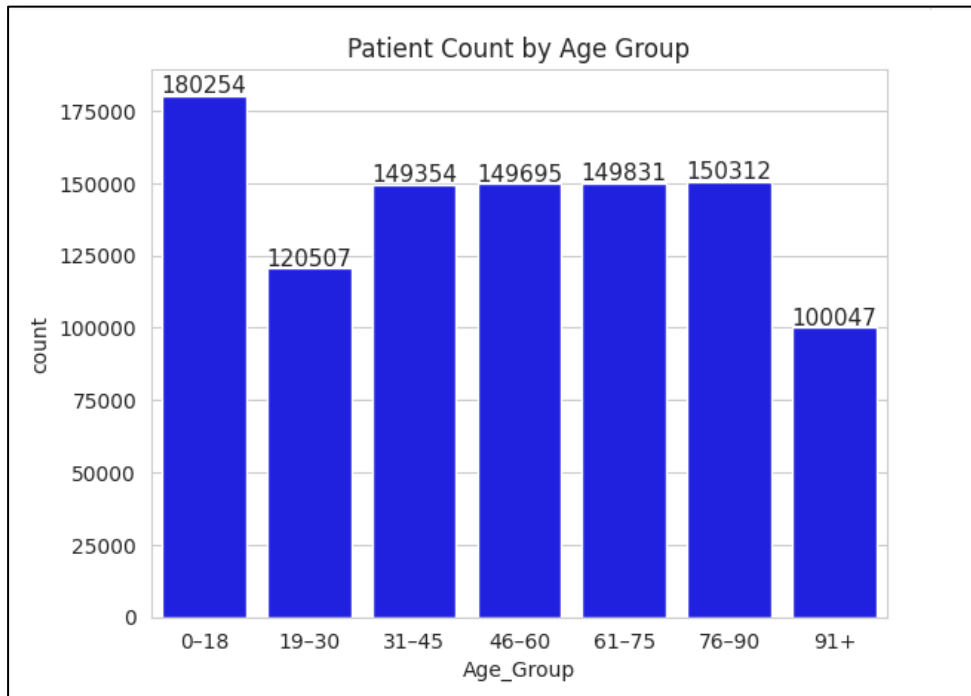
2. Gender Distribution

- **Male:** ~33.38%
- **Female:** ~33.23%
- **Other:** ~33.38%



3. Most Common Age Group

- **0-18 years** has the highest hospital admissions.
- **Older adults (60+)** account for nearly 45% of all hospitalizations.

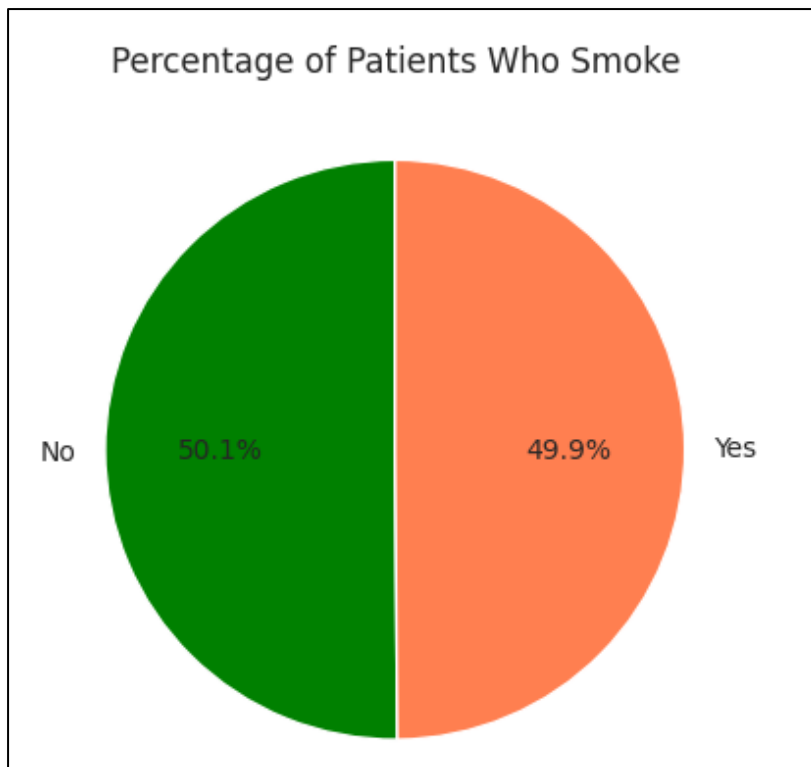


4. Medical History

- **Yes:** 50.03%
- **No:** 49.97%
- Half of the patients have a medical history, reinforcing the need for continuous care and monitoring.

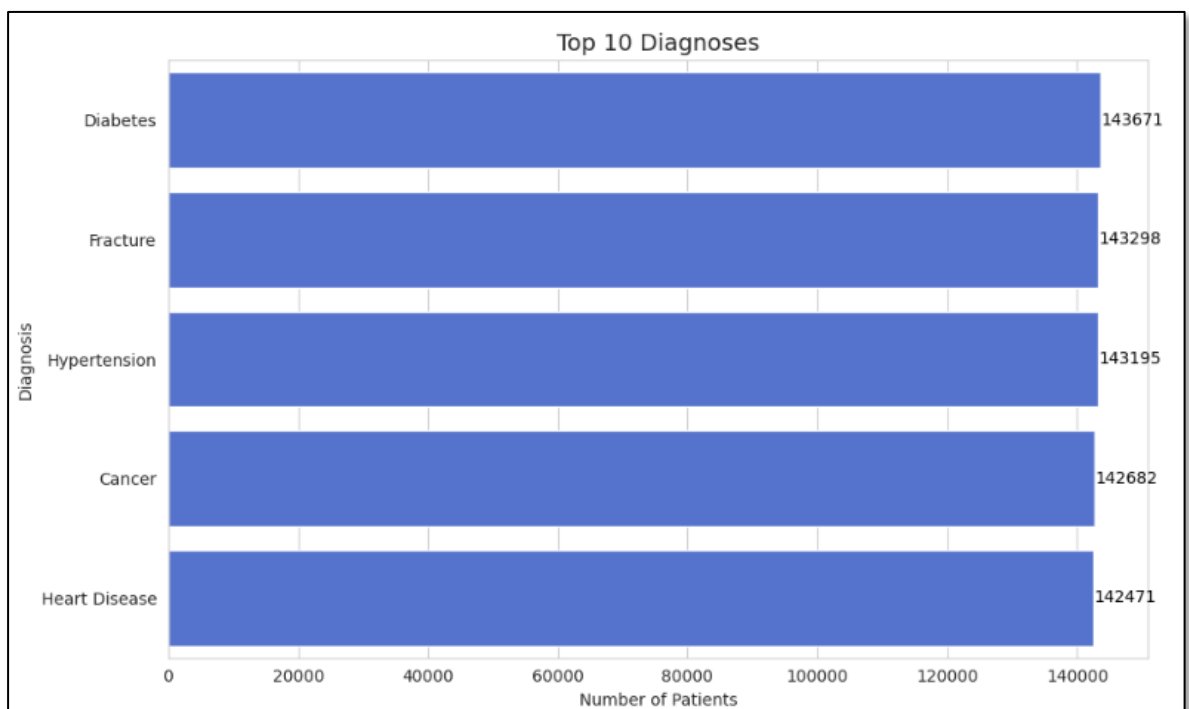
5. Smoking Status

- **Smokers:** 49.9%
- **Non-Smokers:** 50.1%
- Balanced distribution allows investigation of lifestyle-related health impacts.



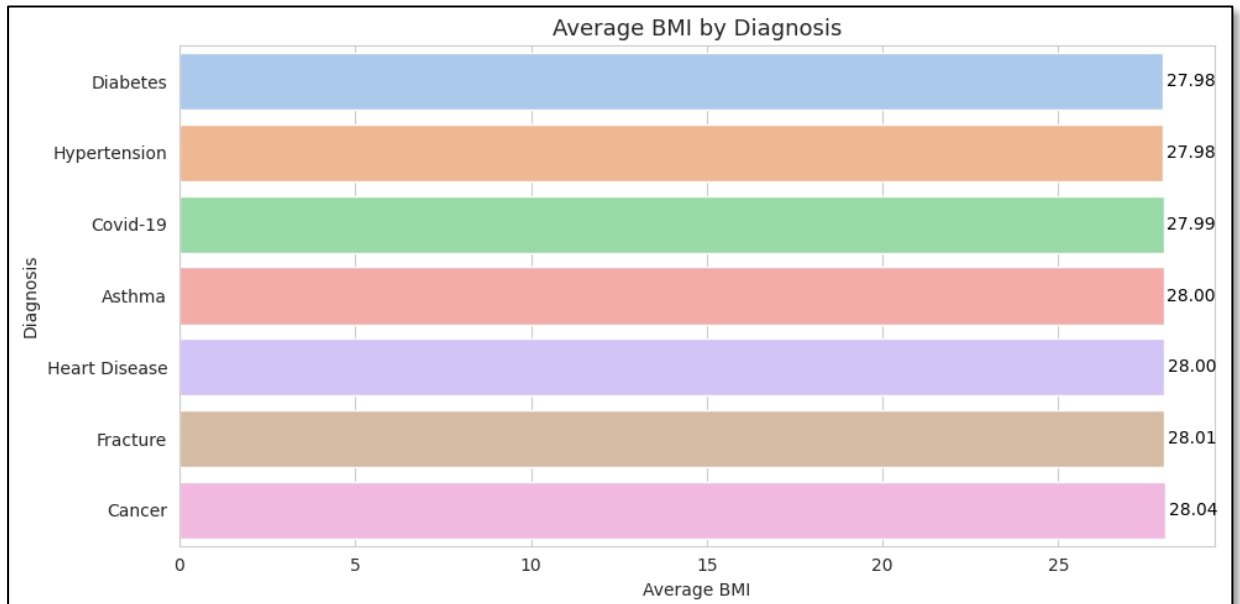
6. Top 5 Diagnoses

- Diabetes, Fracture, Hypertension, Cancer, Heart Disease.
- Reflects a mix of chronic conditions and emergency care cases.



7. BMI vs Diagnosis

- Average BMI varies slightly across diagnoses (27.97 to 28.04).
- No strong correlation found between BMI and specific conditions.

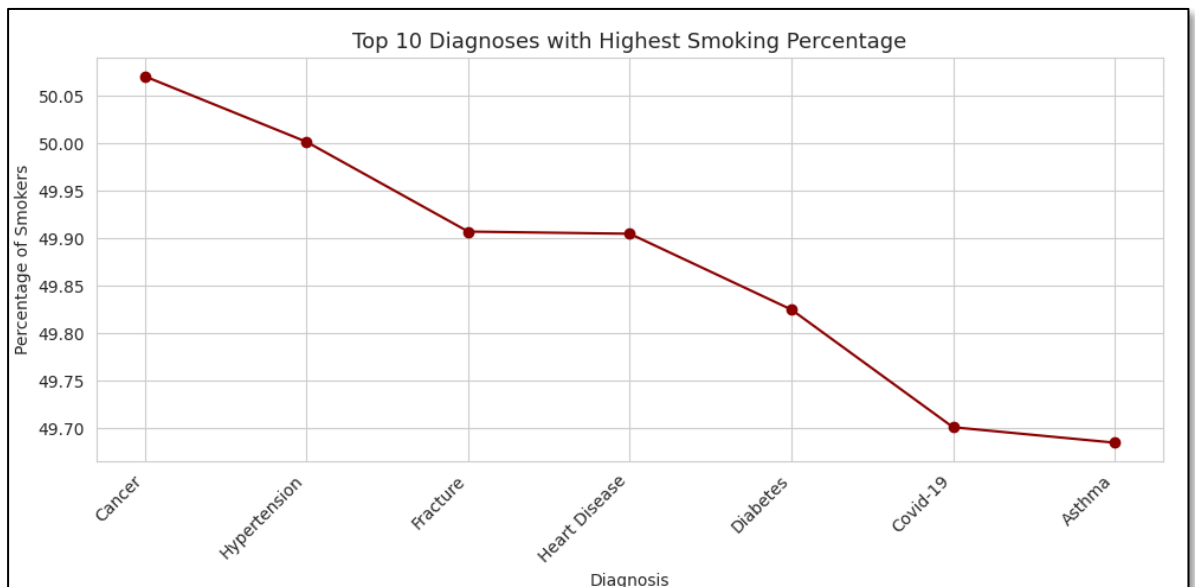


8. Hospitalization Duration by Gender

- All genders have an average stay around 182 days.
- No significant variation by gender.

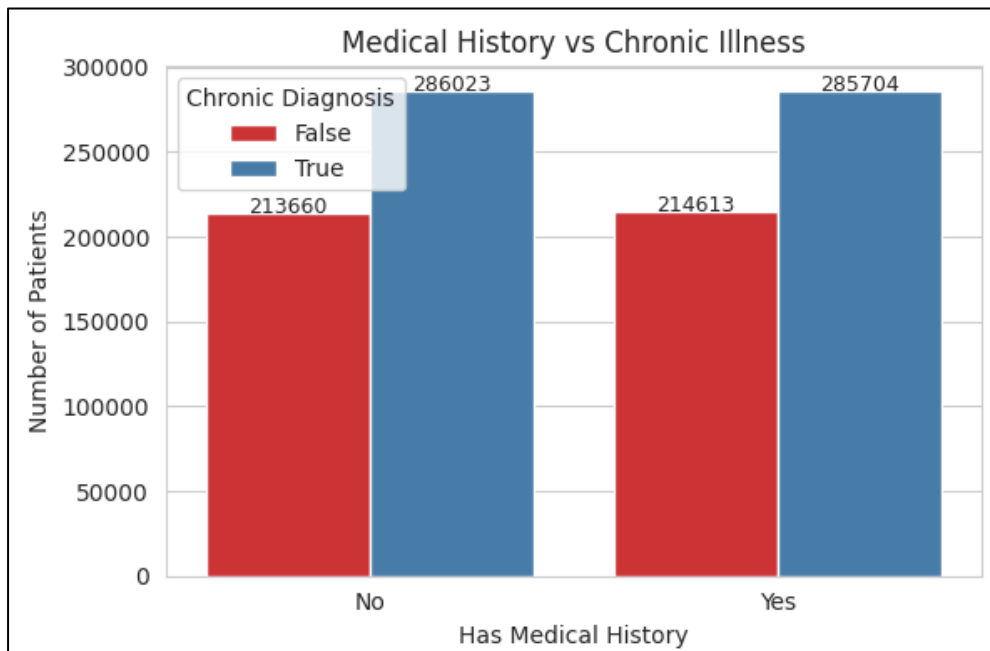
9. Smoking Status vs Diagnosis

- Smokers are more prone to heart disease, cancer, and respiratory conditions.



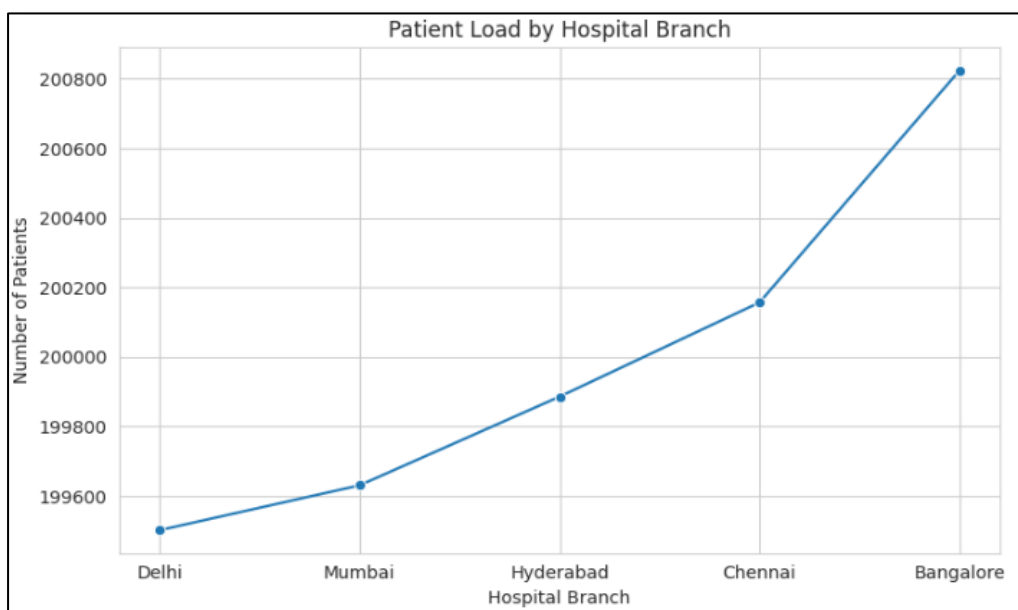
10. Medical History vs Diagnosis

- Both patients with or without a medical history can be diagnosed with chronic illnesses like diabetes and hypertension.



11. Hospital Branch Load

- Bangalore** has the highest patient load.
- All branches handle close to 200,000 patients, indicating balanced operations.

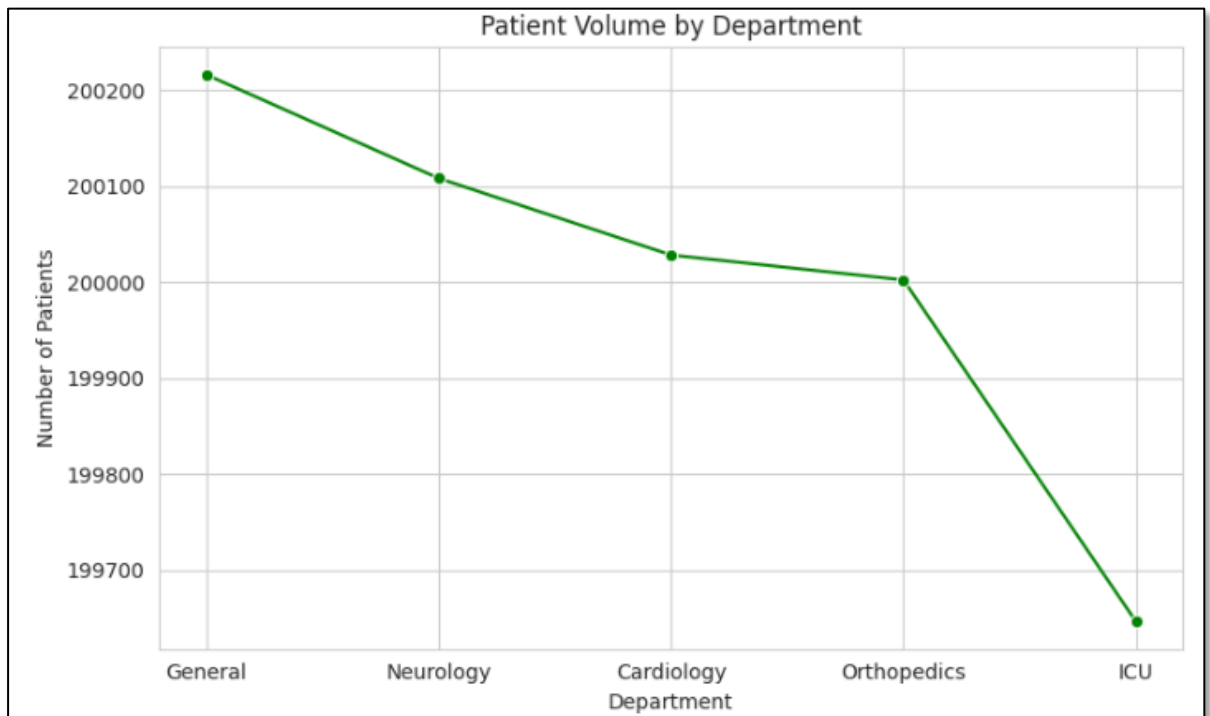


12. Average Length of Stay

- 182.02 days** — unusually high and may reflect long-term care cases or synthetic data design.

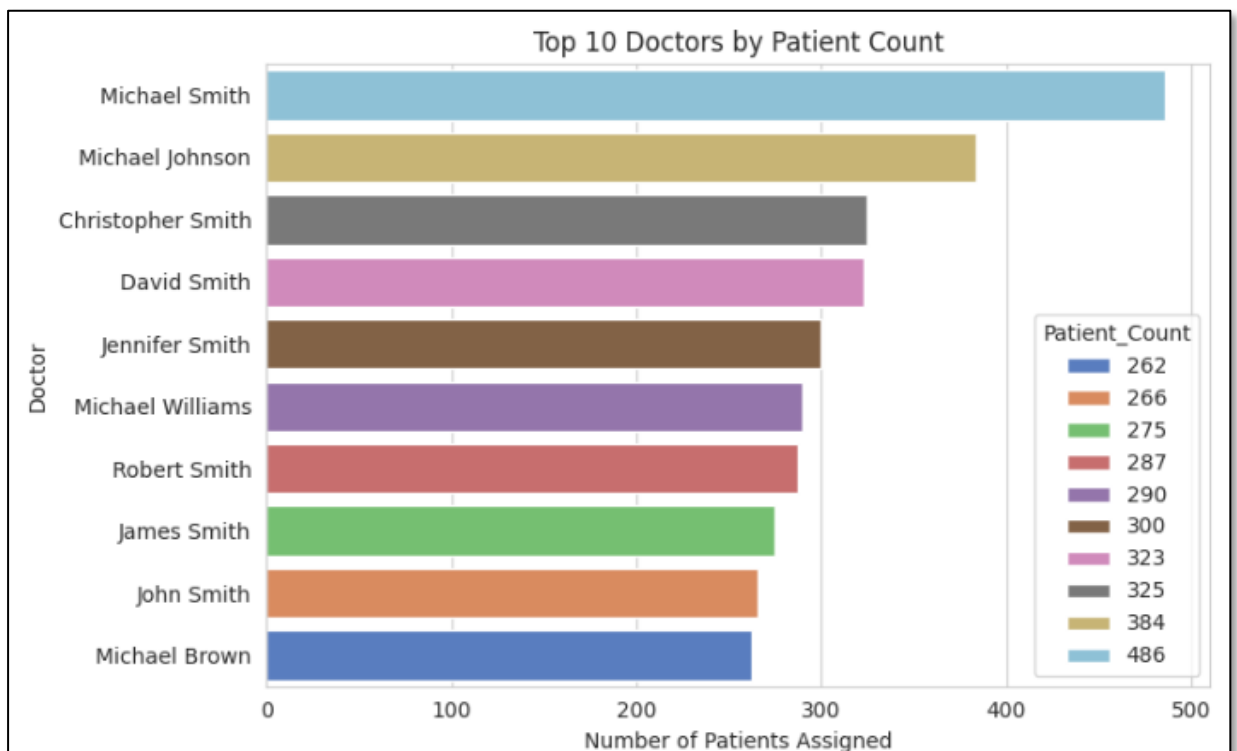
13. Department Load

- **General Department** sees the highest patient volume.
- Neurology, Cardiology, and Orthopedics are also heavily utilized.



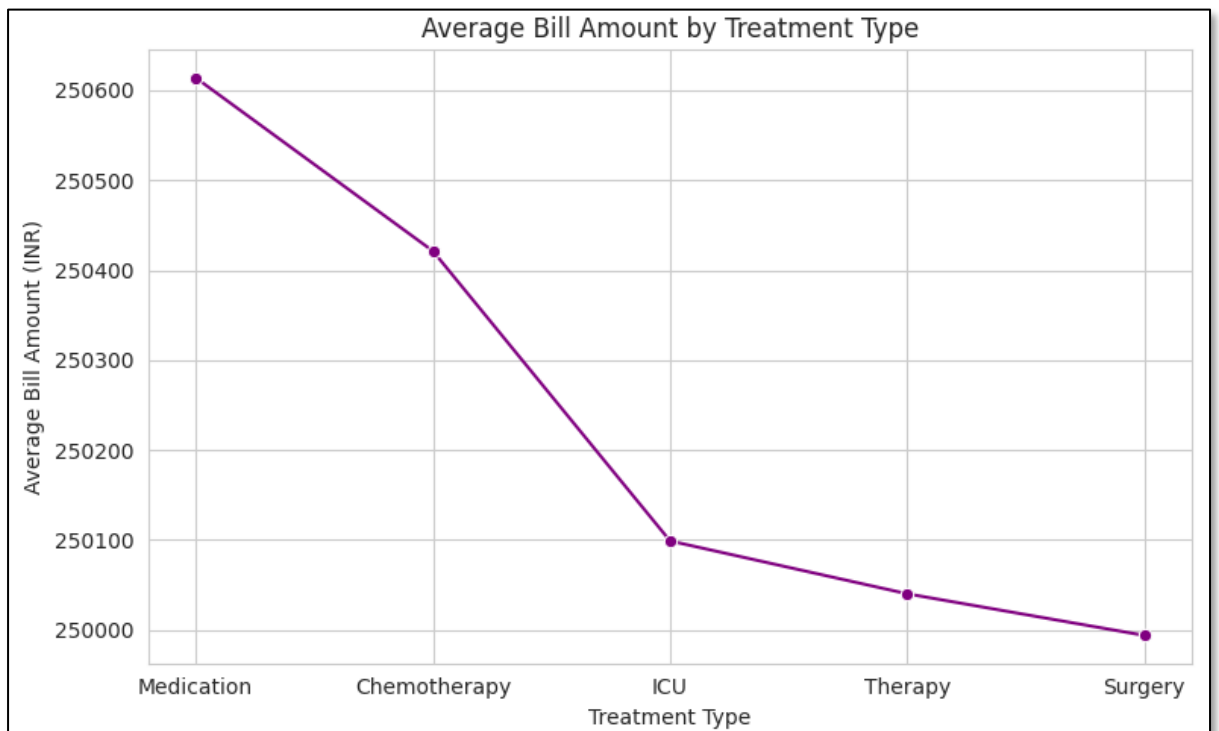
14. Doctor Assigned

- **Michael smith** has received most patients.



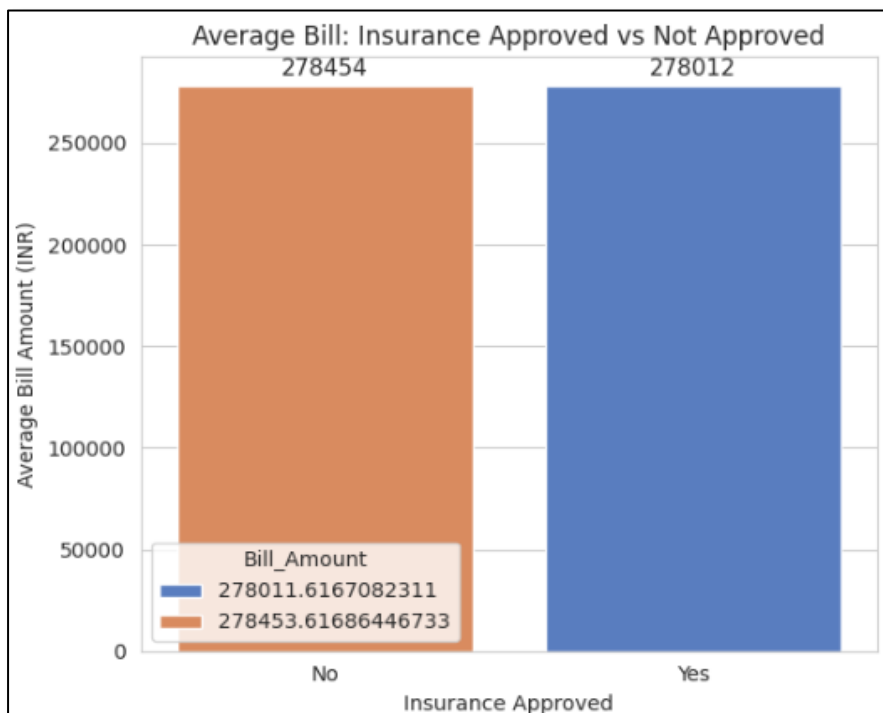
15. Average Bill Amount for Each Treatment Type

- Medication has the highest bill amount at ₹250,613.97



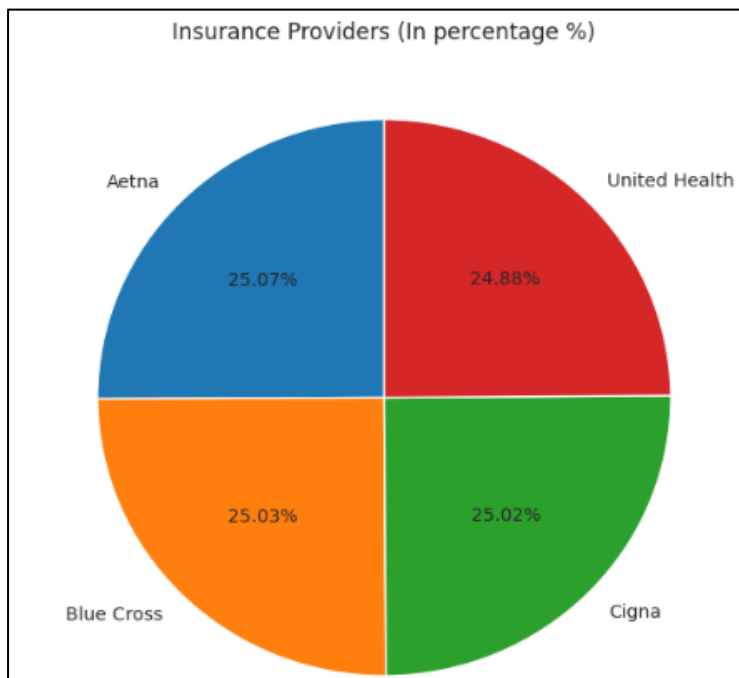
16. Cost Difference Between Patients with or Without Insurance

- Patients with or without insurance have **almost the same** cost difference.



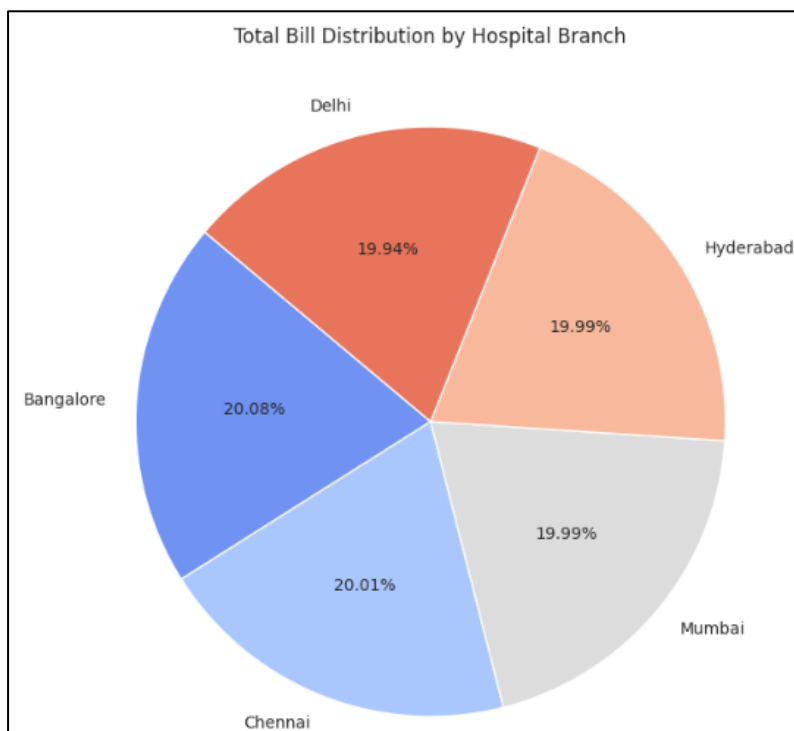
17. Insurance Providers

- **Aetna** covers most patients, with a total of **200,499**.



18. Hospital Branch Contributes Total Billing

- With hospital billings surpassing **₹50.24 billion**, **Bangalore** is the leading branch in overall revenue.

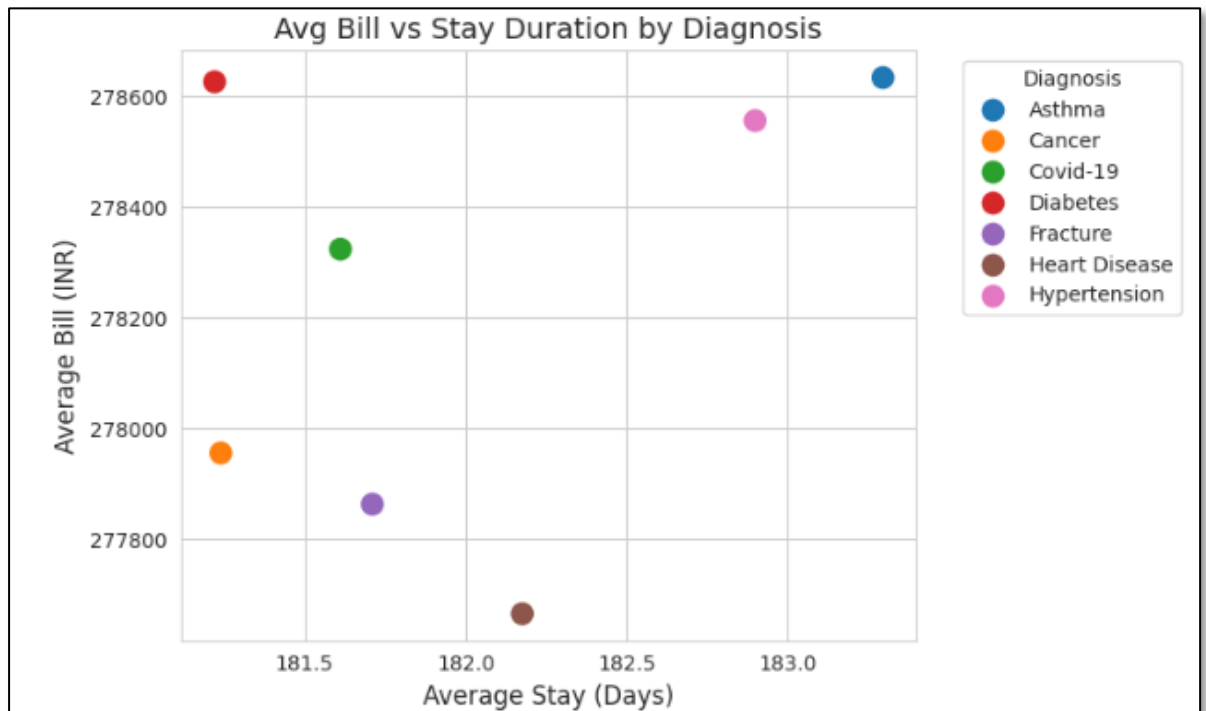


19. Correlation Between BMI And Bill Amount

- There is **no relationship** between BMI and Bill amount.

20. Relation Between Average Stay Length and Bill Amount by Diagnosis

- Certain diagnoses like **hypertension and asthma** are linked to longer stays and higher bills, likely due to intensive care and monitoring needs.



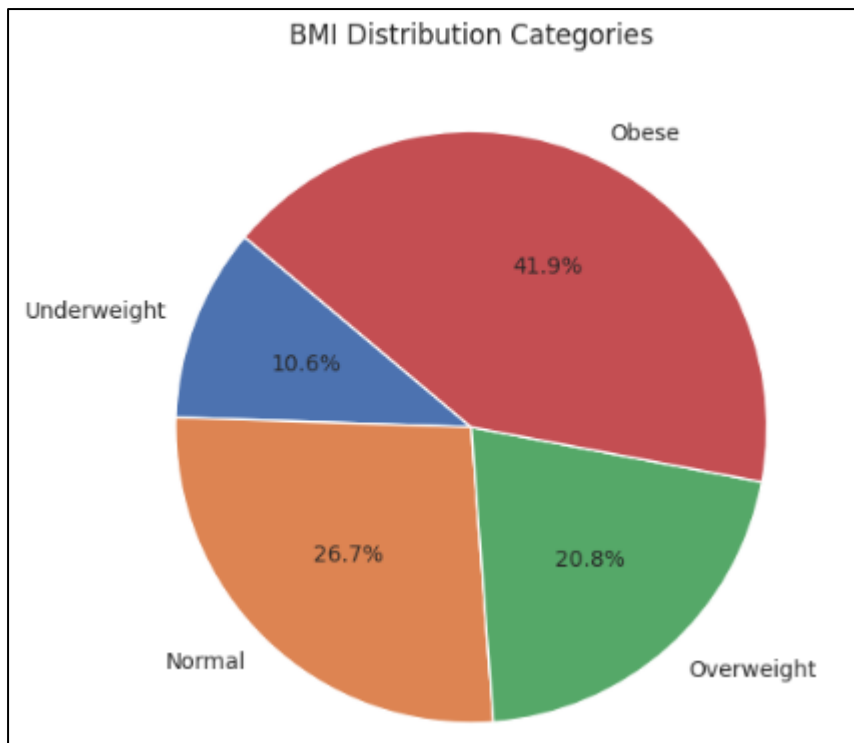
21. Room Occupancy Across Different Hospital Branches

- Bangalore** has highest average room occupancy.

| | Hospital_Branch | Average_Patients_per_Room |
|--|-----------------|---------------------------|
| Average Number of Patients per Room (per Branch) | | |
| 0 | Bangalore | 223.140000 |
| 1 | Chennai | 222.400000 |
| 2 | Delhi | 221.670000 |
| 3 | Hyderabad | 222.100000 |
| 4 | Mumbai | 221.810000 |

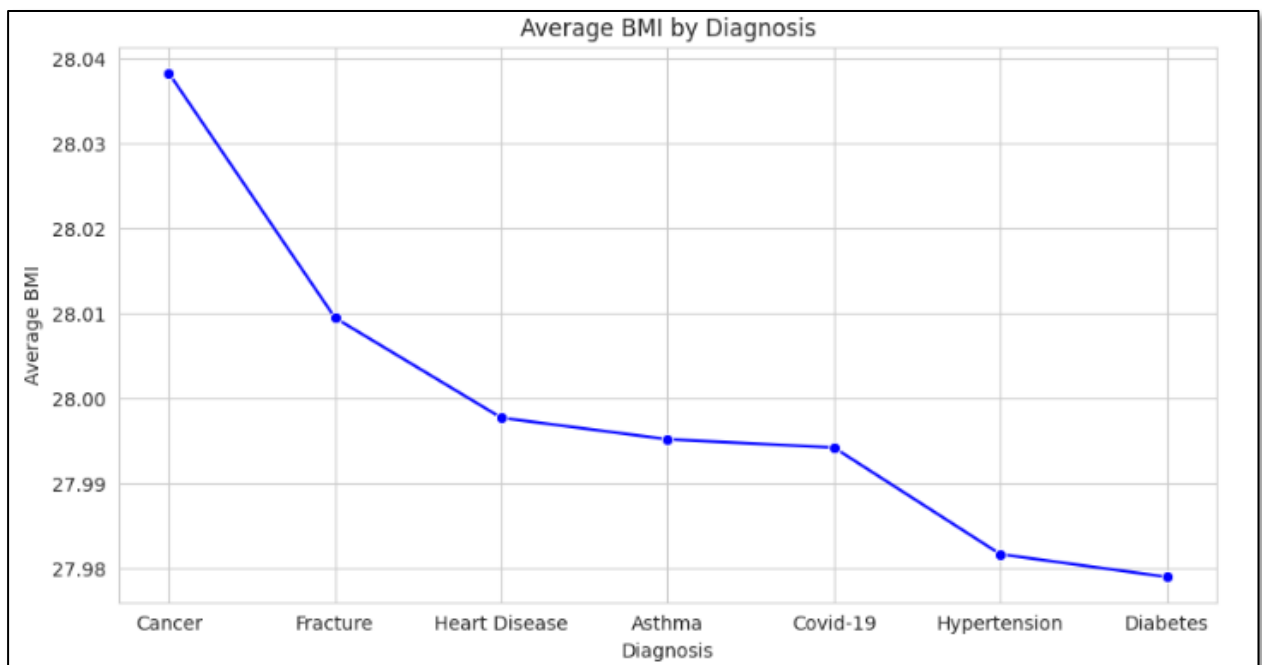
22. BMI Distribution

- Average BMI: 28.0**
- 41.9%** of patients fall into **obese category**.



23. Relationship Between BMI And Diagnosis

- **Cancer and fracture** patients show highest average BMI.



24. Emergency Patient Contact Information

- **All patients (100%)** have complete emergency contact details, including name and phone number.

Conclusion

This project demonstrates how data analytics can uncover meaningful patterns in hospital operations and patient health trends.

Key insights include:

- The **General department** handles the highest patient volume.
- **Diabetes** and **Hypertension** are among the most common diagnosis.

Using data in healthcare helps hospitals work faster and be better prepared for emergencies. It also helps doctors make smarter decisions, which leads to healthier patients and better care overall. Data-driven healthcare can significantly improve **efficiency, preparedness, and patient outcomes**.