HOSPITAL EMERGENCY ROOM (ER) ANALYSIS

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PROJECT BREAKDOWN

- Introduction
- Data Cleaning and Preprocessing
- Patient Demographics and Satisfaction Analysis
- Patient Wait Time & Efficiency Analysis
- Admission and Referral Trends
- Recommendations
- Conclusions

INTRODUCTION

This analysis examines hospital emergency room(ER) data to identify key trends in patient demographics, admission patterns, waiting times, department referrals, and patient satisfaction. By leveraging data driven insights, hospitals can enhance workflow efficiency and improve patient outcomes.

Project Objectives include:

- Perform Data Cleaning and Preprocessing
- Generate KPIs and Key metrics
- Measure Patient Demographics and Satisfaction Analysis
- Evaluate Wait Time and Efficiency Analysis
- Analyze patient Admission and Referral Trends
- Provide Data driven recommendations

Project Outcome:

The goal of this project is to provide a data-backed foundation for improving hospital work-flows, resource allocation, and overall patient experience.

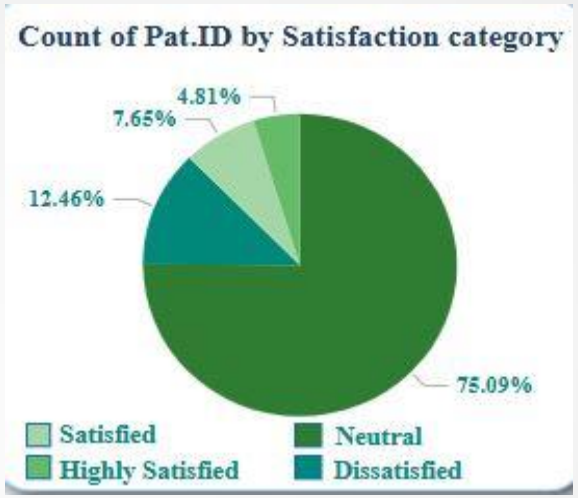
DATA CLEANING & PREPROCESSING

THE DATA CLENANING AND PREPROCESSING STAGE INCLUDES:

- ✓ Deriving additional features ‘Referral rate(%)’, ‘Satisfaction category’, ‘Wait time category’, ‘Readmission rate’, ‘Admission type’, ‘Age group’, ‘Readmission flag’, ‘High risk patients’.
- ✓ **Data Cleaning**: This stage involves:
  - ➢ Check for Duplicate data
  - ➢ Check for Incorrect data types
  - ➢ Check for Missing data
  - ➢ Check for Data inconsistency
  - ➢ Check for Special characters

Patient Demographics and Satisfaction Analysis

SUMMARY ANALYSIS
Majority of patients (78.09%) reported a neutral satisfaction level (Score = 5), indicating a moderate experience. However, 12.46% were dissatisfied (Score < 5), while only 7.65% were satisfied (score = 6-7) and 4.81% were highly satisfied (score = 8-10).



SUMMARY ANALYSIS
This reveals a fluctuating trend, indicating variability in patient experience across different admission periods.

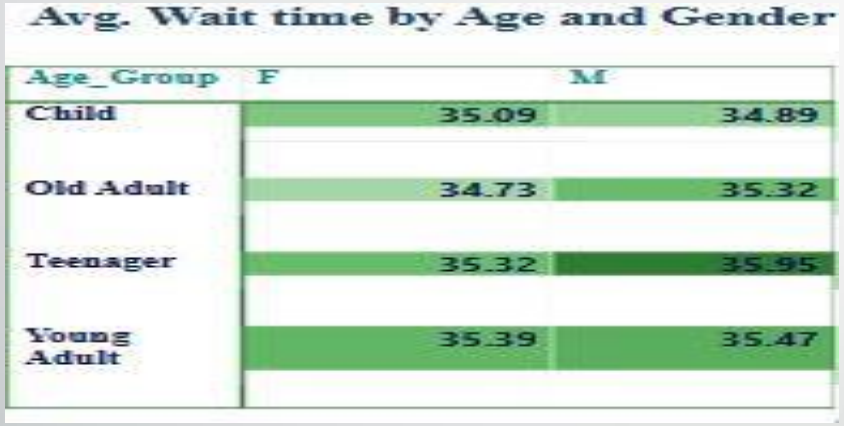
SUMMARY ANALYSIS
This highlights the relationship between patient satisfaction, department referrals and wait times . Department with short wait times generally show high satisfaction scores while those with long wait time show lower satisfaction level.

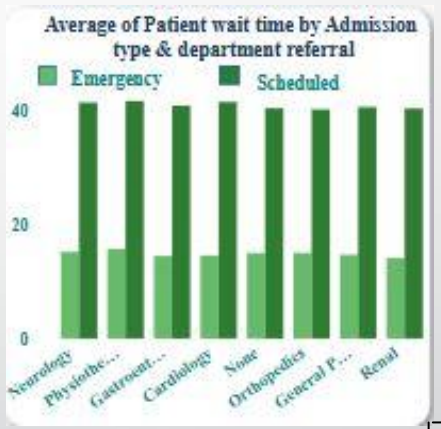
Average Satisfaction score by Department &Wait time

Department Referral	Long Wait	Moderate Wait	Short Wait
Cardiology	4.96	5.15	5.02
Gastroenterology	5.51	5.20	4.74
General Practice	5.04	4.96	5.07
Neurology	4.75	5.32	5.43
None	5.00	4.94	5.05
Orthopedics	4.96	4.86	5.14
Physiotherapy	5.02	5.01	4.91
Renal	4.86	4.90	4.89

Patient Wait Time and Efficiency Analysis

Line graph summary Analysis: It reveals that emergency admissions consistently show shorter wait times compared to Scheduled admissions





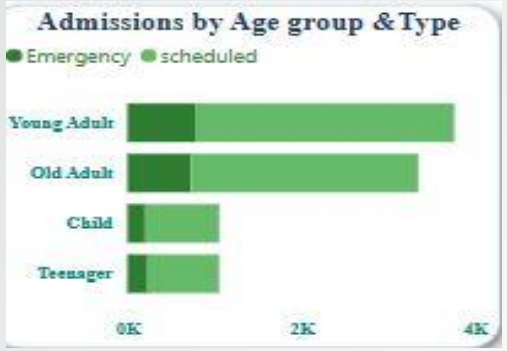
Pie chart summary Analysis: This suggest a potential inefficiency in patient flow management as only 21.13% 0f patient experience a short wait time

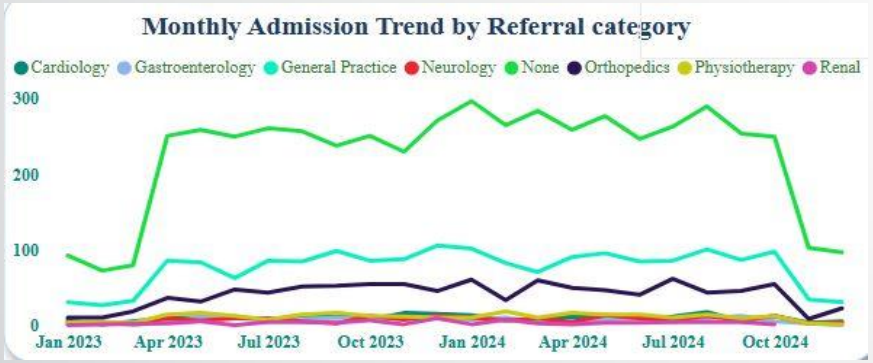
Scatter plot summary Analysis: It indicates that higher patient wait time is associated with lower satisfaction

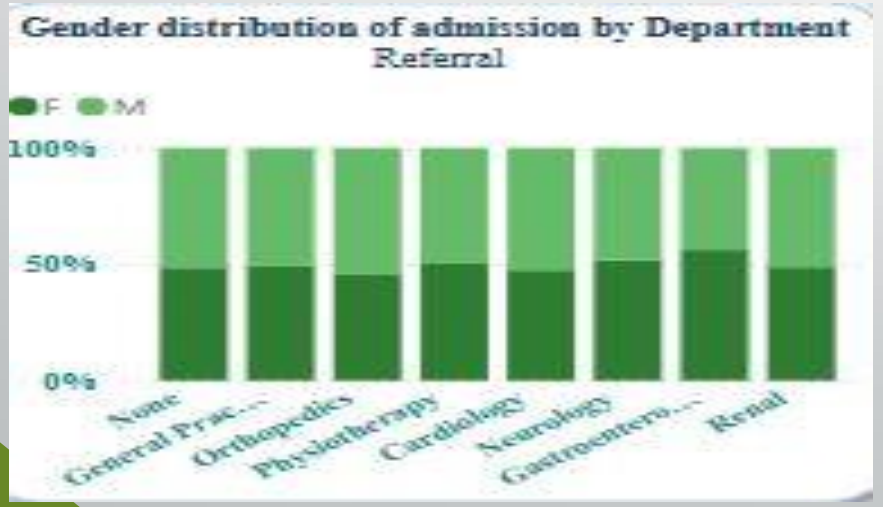
Heatmap summary Analysis: This analysis reveals minimal variation in wait times across different age group with teenagers experiencing the longest wait time (35.65). Additionally, Male patients experienced slightly higher wait times than female patients

Clustered column summary Analysis: This indicate potential inefficiencies in patient processing to enhance hospital workflow

Patient Admission and Referral Trends Analysis







Summary Analysis

Scheduled admissions are consistently higher across all age groups compared to emergency admissions, with the highest rate observed in young adult & old adults. This indicate greater reliance on planned medical care across demographics.

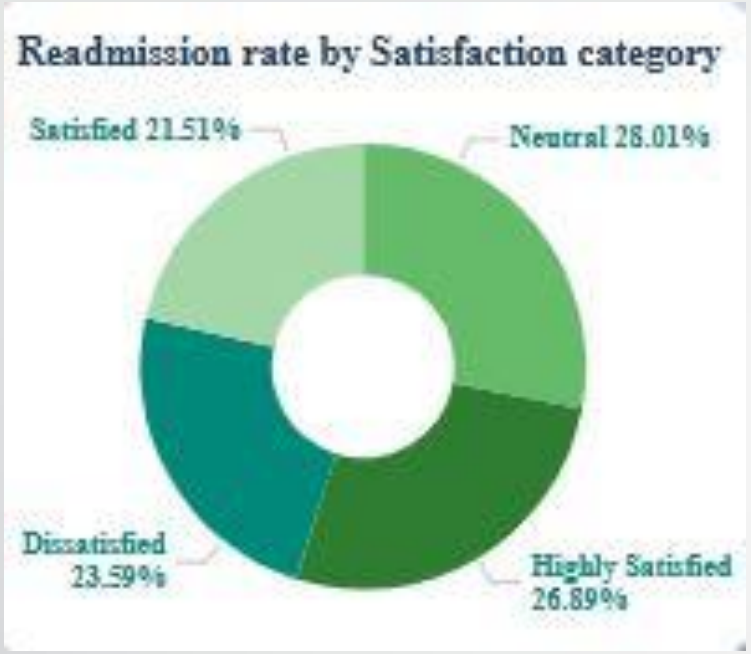
Summary Analysis

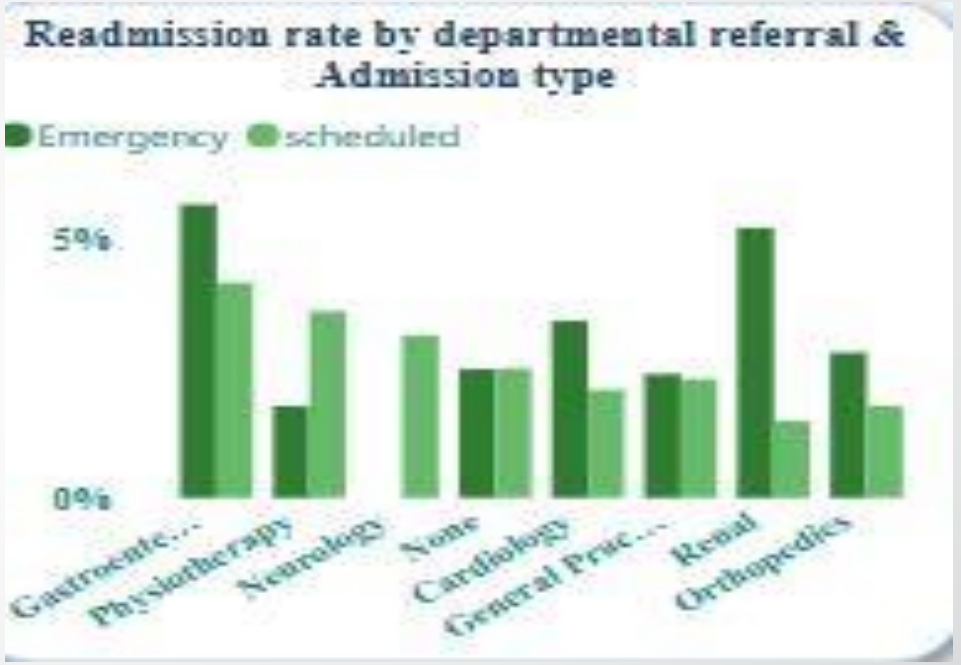
The monthly admission trend by department referral category shows fluctuations in patient inflow, with certain department (e . g General practice & orthopedics) contributing more significantly to admissions over time

Summary Analysis

This reveals variations in referral patterns between male and female patients. Certain departments have a higher proportion of female (e. g Gastroenterology) indicating potential difference in medical needs across genders

Patient Admission and Referral Trends Analysis





Summary Analysis

Patients with a neutral satisfaction level have the highest readmission rate (28.01%), followed closely by highly satisfied patients. Interestingly, satisfied patient have lower readmission rate than both dissatisfied and highly satisfied patients. This implies that while dissatisfaction may contribute to readmissions, other factors beyond patient satisfaction could be influencing return visits

Summary Analysis

This reveals significant variations as emergency admissions surpass scheduled admissions in certain departments (e . g Renal, Gastroenterology). In contrast, physiotherapy has more scheduled than emergency admissions while neurology exclusively receives scheduled admissions. This trend shows differences in patient intake across department suggesting areas for better resource use and efficiency

Recommendations

1. Optimize patient flow management: Use patient wait time analysis to identify bottlenecks and improve service efficiency
2. Monitor admission trends: Regularly analyze admission data to anticipate demand fluctuations, optimize staff deployment and resource allocation in high demand department and enhance hospital capacity planning.
3. Enhance Referral efficiency: Strengthen interdepartmental collaboration to streamline referrals and minimize unnecessary delays.
4. Improve patient satisfaction strategies: Address long wait times and low satisfaction rates through targeted interventions and patient engagement programs.
5. Reduce Readmission rates: Develop predictive models to identify high risk patients and implement follow-up care plans to prevent avoidable readmissions.

Conclusions

This analysis of hospital emergency room (ER) data provides valuable insights into patient satisfaction, wait time efficiency and admission trends. This analysis highlights key inefficiencies in patient flow, referral management and readmission trends. Optimizing wait times, refining referral pathways, and leveraging data-driven strategies can enhance hospital efficiency and patient experience. Continuous monitoring will drive informed decision-making and improved outcomes.