Hospital Emergency Room Analysis

1.Project Overview

This project involves the creation of a dynamic **Emergency Room Performance Dashboard** using Microsoft Excel. The goal was to transform raw hospital data into actionable insights regarding patient flow, departmental efficiency, and service quality.

The dashboard provides a high-level summary of 9,000+ patient records, allowing hospital administrators to monitor KPIs in real-time across different months and years.

2.Purpose & Objective

This **Hospital Emergency Room Dashboard** is designed to provide a comprehensive monthly performance overview of emergency room operations.
The primary goal of this dashboard is to help hospital administrators, doctors, and operations managers**:**

- Monitor patient inflow
- Evaluate service efficiency
- Track admission patterns
- Identify delays and bottlenecks
- Improve patient satisfaction and care quality

The dashboard allows quick decision-making by converting complex hospital data into clear visual insights**.**

3.Key Features

- **Interactive Slicers:** Filter data by Year (2023–2024) and Month to track seasonal trends.
- **KPI Scorecard:** Instant visibility into Total Patients, Average Wait Times, and Satisfaction Scores.
- **Demographic Profiling:** Breakdown of patients by Age Group and Gender to understand the target audience.
- **Operational Analysis:** Visualizing "On-time" vs. "Delayed" status and Admission vs. Non-admission rates.

4.Visual Components

- **Attendance Status (Pie Chart):** Monitors the percentage of patients seen "Ontime" vs. "Delayed."
- **Demographic Analysis (Pie Chart):** Breaks down the patient base by gender.
- **Volume by Age Group (Column Chart):** Categorizes patients into 10-year age brackets to identify peak demographic needs.
- **Departmental Distribution (Bar Chart):** Shows the workload across various hospital units like Orthopedics and Cardiology.

- **Trend Analysis (Area Charts):** Mini-charts within KPI cards show the fluctuation of patient volume and wait times over the reporting period.

5.Tools & Technologies Used

- **Microsoft Excel** – Data analysis & dashboard creation
- **Excel Pivot Tables & Charts** – Data summarization and visualization
- **Excel Slicers** – Month & year filtering
- **Excel Formulas** – COUNT, AVERAGE, IF, SUMIFS
- **Data Cleaning (Power Query)** – Handling missing and duplicate data

6.Dataset Summary

The dataset contains 9,216 emergency room patient records with 12 attributes, including patient demographics, wait time, admission status, department referral, and satisfaction scores. It is used to analyze patient flow, service efficiency, admission patterns, and overall ER performance**.**

➢ Dataset Size

- **Number of Rows:** 9,216
- **Number of Columns:** 12

➢ Key Attribute

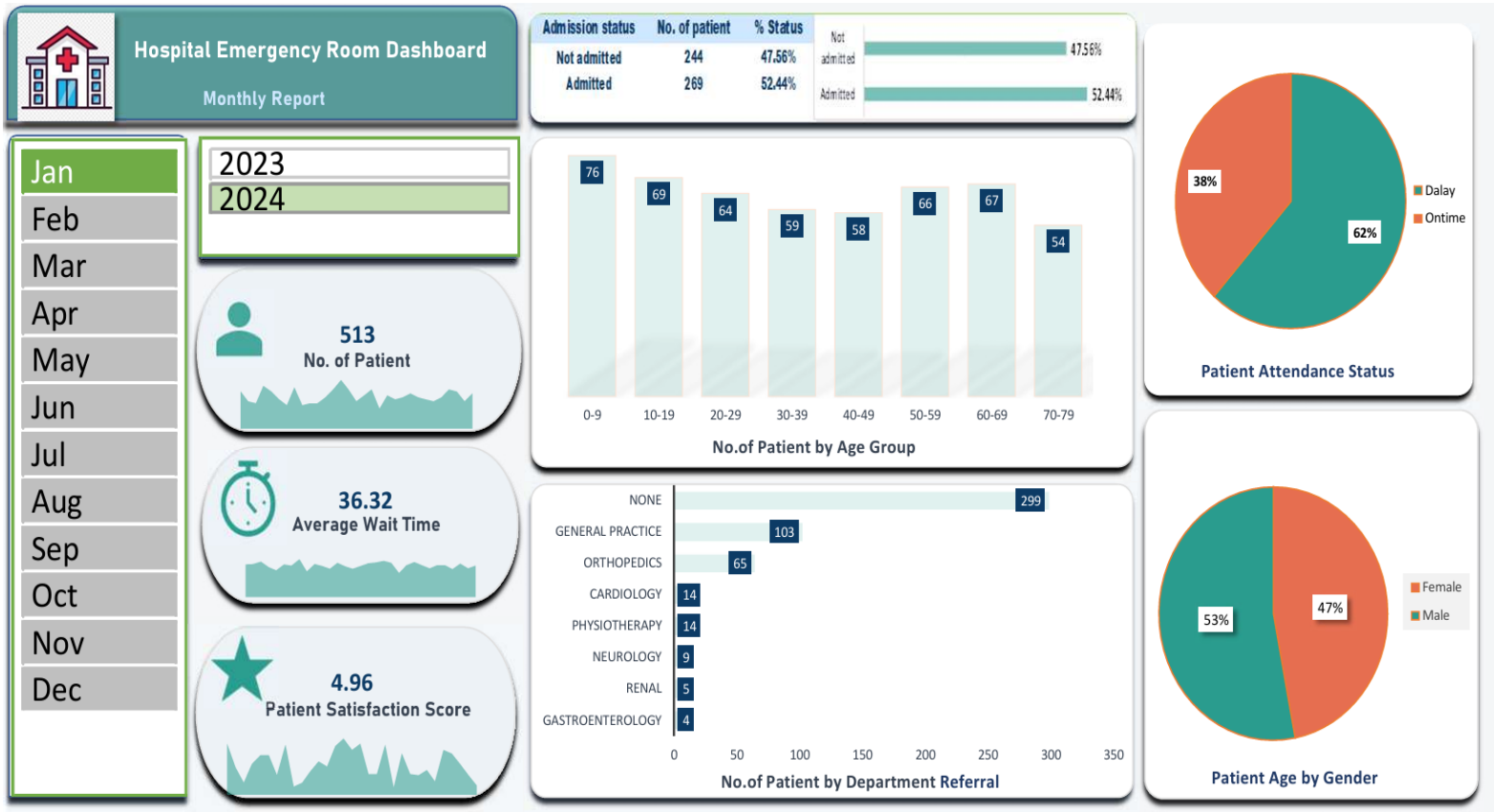
- **Patient ID** – Unique identifier for each patient visit
- **Admission Date** – Used for monthly and yearly trend analysis
- **Patient Gender** – Gender-wise patient distribution
- **Patient Age** – Age-based analysis of ER visits
- **Patient Race** – Demographic insights
- **Department Referral** – Department-wise patient inflow
- **Admission Flag** – Indicates whether the patient was admitted or not
- **Wait Time (Minutes)** – Time waited before treatment
- **Patient Satisfaction Score** – Feedback rating from patients

➢ Data Preparation

- Removed duplicate and missing records
- Standardized categorical values (Gender, Department, Admission Flag)
- Converted date fields for Month and Year analysis
- Ensured numerical consistency for Age, Wait Time, and Satisfaction Score
- Created calculated measures for dashboard KPIs

➢ Key KPIs

- **Total Patients:** 9,216
- **Average Wait Time:** ~35 minutes
- **Average Satisfaction Score:** ~4.9 / 5
- **Admitted Patients:** ~50 and **Non-Admitted Patients:** ~50%



7.Key Performance Indicators (KPI Section)

At the center of the dashboard, KPI cards present the most critical metrics:

◈ Total Number of Patients – 513

This KPI represents the total ER visits during the selected time period.
It helps management understand:

- Patient load
- Resource demand
- Staffing requirements

◈ Average Wait Time – 36.32 Minutes

This metric shows how long patients wait on average before receiving medical attention.

- A wait time of around 36 minutes indicates moderate efficiency
- Long wait times may lead to dissatisfaction and delays in treatment

This KPI is essential for process optimization and staffing decisions**.**

◈ Patient Satisfaction Score – 4.96 / 5

This score reflects patient feedback on ER services.

- A score close to 5 indicates high-quality care and positive patient experience

8.Visual Analysis Sections

➢ Admission Status

- **Admitted:** ~52%
- **Not Admitted:** ~48%

Insight: Nearly half the ER visitors do not require admission, indicating effective triage.

➢ Patient Attendance Status (Pie Chart)

- **On-time: 62%**
- **Delayed: 38%**

Insight: While most patients are attended on time, delays still affect over one-third, showing room for process improvement.

➢ Patients by Age Group (Bar Chart)

- Highest patient counts in 0–9 and 10–19 age groups
- Lower counts in elderly groups (70–79)

Insight: ER usage is higher among children and young adults, suggesting focus areas for pediatric and youth care.

➢ Patients by Department

- General Practice has the highest load
- Followed by Orthopedics and Cardiology
- Specialized departments (Neurology, Renal, Gastroenterology) have lower volume

Insight: General medical cases dominate ER visits, requiring adequate staffing in core departments.

➢ Patient Age by Gender (Pie Chart)

- **Male:** 53%
- **Female:** 47%

Insight: Gender distribution is almost balanced, with slightly higher male patient visits.

9.Buisness Insight

- **High patient volume with strong satisfaction** indicates efficient emergency care delivery.
- **Average wait time (~35 minutes)** highlights scope for improving operational efficiency.
- **Nearly equal admission and non-admission rates** show effective triage and bed utilization.

- **Younger age groups and General Practice** drive most ER visits, requiring focused staffing.
- **Service delays for a significant portion of patients** indicate a need for process optimization during peak hours.