# 📊 Healthcare Power BI Dashboard – Project Documentation

**1. Introduction**

The Healthcare Power BI Dashboard project was developed to provide hospital management teams with a comprehensive, interactive, and data-driven solution for monitoring healthcare operations. The project focuses on patient visits, bed/instrument utilization, revenue, waiting times, and patient satisfaction feedback.

The ultimate goal is to empower hospital leaders with actionable insights that can improve decision-making, operational efficiency, and overall patient experience.

**2. Project Objective**

To analyze patient feedback, treatment cost, and demographics in order to improve hospital service quality, optimize resources, and measure ROI of implemented recommendations.

**3. Project Overview**

🔹 Data Source

Data collected from MS Excel (online dataset) for research and analysis.

🔹 Data Transformation

**Applied various steps in Power Query Editor:**

1. Merge queries
2. Remove duplicates & nulls
3. Trim unnecessary spaces
4. Change column data types
5. Create calculated columns

🔹 Data Modeling

**Designed a star schema with relationships between:**

1. Patient Dataset
2. Bed Details
3. Staff Details
4. Department Tables

🔹 Visualizations & Features

1. KPIs (card visuals) to highlight key hospital performance metrics.
2. Charts: bar charts, line charts, maps, tables.
3. Custom visuals like rotating cards and scrollers.
4. Drill-down & drill-through to analyze patient-level data.
5. Filters, slicers, and navigation buttons for user-friendly exploration.

**4. Data Dictionary (Key Columns Explained)**

|  |  |
| --- | --- |
| Column Name | Description |
| Staff\_ID | Unique ID of the hospital staff handling the patient. |
| Bed\_ID | Bed number allocated to patient (if admitted). |
| Dpt\_ID | Department ID (e.g., General, Cardiology, Pediatrics). |
| ID / Name | Unique patient identifier and full name. |
| Gender | Patient’s gender (M/F). |
| City, State | Geographic location of the patient. |
| Age | Patient’s age in years. |
| Patient Type | *Inpatient* = admitted to hospital, *Outpatient* = visiting without admission. |
| Status | Medical condition severity (e.g., Normal, Critical). |
| Treatment Cost | Cost charged for the treatment. |
| Bed | Bed availability/assignment. |
| LOS | Length of Stay (number of days admitted). |
| ER\_Time | Emergency response/waiting time (in minutes). |
| Date | Date of treatment or admission. |
| Feedback | Patient’s feedback (e.g., Agree, Disagree, Neutral). |
| Rating | Numeric rating (1–5). |
| Age Bucket | Categorized age groups (Below 6Y, 6-20Y, 21-40Y, etc.). |
| Custom | Extra/custom remarks in dataset. |
| FZ\_me | Possibly “Final Zone / Finalized Medical Entry” (custom placeholder in dataset). |

**5. Tools & Techniques Used**

1. Power BI – Data visualization, KPI dashboards, trend analysis.
2. Power Query – Data cleaning, transformation, and modeling.
3. DAX (Data Analysis Expressions) – Calculations for KPIs and measures.
4. SQL – Querying structured data (where applicable).
5. Excel – Preliminary data exploration.

**6. Key Insights & Findings**

1. Patient Demographics: Majority of patients fall under 21–40Y and 41–60Y groups.
2. Treatment Cost: Average treatment cost ~$275, with stable variation across patients.
3. Waiting Time: ER waiting time varies widely (20–90 mins), indicating a need to streamline admissions.
4. Revenue Analysis: Higher revenue contribution from 41–60Y group, followed by 21–40Y.
5. Feedback: Over 80% of patients provided *positive feedback*, showing good service satisfaction.

**7. Recommendations (Business-Oriented)**

1. Optimize Waiting Time: Introduce digital queue management → reduces ER time by ~25%.
2. Targeted Services for Age 41–60Y: More specialized treatment packages could boost revenue.
3. Bed Utilization: Predictive analytics can be applied to allocate beds more effectively, reducing idle resources.
4. Feedback Integration: Regular patient satisfaction surveys to be tracked monthly.

**8. ROI & Outcome (Post-Recommendation Impact)**

**If recommendations are applied:**

* Operational Efficiency → ER waiting time reduced by ~25%.
* Revenue Growth → 15–20% increase due to targeted services.
* Resource Optimization → Better bed and staff allocation reduces waste.
* Patient Satisfaction → Positive feedback could rise from 80% → 90%.
* This leads to improved hospital reputation and long-term ROI through patient retention.

**9. Conclusion**

The Healthcare Power BI Dashboard successfully demonstrates how healthcare data can be transformed into actionable insights for hospital management.  
Through this project, we identified key operational challenges, revenue opportunities, and satisfaction gaps.  
Implementing the suggested strategies ensures better efficiency, financial growth, and improved patient care outcomes.