



COLUMBIA ASIA HOSPITAL

Problem Statement

You have been hired as a consultant data analyst by Columbia Asia Hospital. The Hospital is looking for the following key insights for the following objectives.

- Assess the hospital's revenue generation
- Insights about suitable departments for new hires
- Strategies suggestions for patient discounts

Your task is to perform data analysis and come up with a report in order to help the organisation with the mentioned objectives.

We analyse the data about the columbia asia hospital, this document provides information about the hospital's revenue and hiring new departments, and we give some strategic ideas about patient discounts.

OBJECTIVE QUESTION

- We have done the data cleaning properly.
- The hospital HR data transform into power query editor
- We are getting data from excel. We have two tables like hospital HR(csv.file), hospital doctor data(excel). The hospital HR file has some inconsistent data.

Method Used for cleaning the data

1. HANDLING MISSING/NULL VALUES; In the hospital HR table, the patient satisfaction score column has null values. The null value was replaced by the average sat score of 5.64.

2. COMBINE COLUMN; The data have two columns: first name and last name of the patients. We have used the combine column feature to merge two columns with a space delimiter and name it as Full Name.

3. NEW GROUP FEATURE; The data has a column of patient age. The age was segregated into four categories using the New Group feature.

- 1. 1-12 - kids**
- 2. 13-35 - youth**
- 3. 36-55 - mid-age**
- 4. 56-79 - old**

4. FORMATTING DATE COLUMN; In the data, the date column in the text format. We have changed the date format, text into date and time format.

5. MERGE QUERIES; In the power query editor, we merged the tables of hospital doctor data and the hospital HR table using the patient id. Because the patient id was commonly present in both tables and name it as columbia asia hospital.

- **TOTAL DOCTORS;**

Dax formula - Total Doctors = `DISTINCTCOUNT('columbia asia hospital'[Doctor ID])`

Measure name = Total Doctors

Aggregate function = `DISTINCT COUNT('columbia asia hospital'[Doctor ID])`

TOTAL DOCTORS = 22

1.Assess the Average Waiting Time: Analyse the patient wait times to identify the average duration a patient spends before receiving care.

- We are using the dax formula to extract the average wait time of patients. The x axis has the avg.wait time and the y axis has the department.

- **AVERAGE WAIT TIME :**

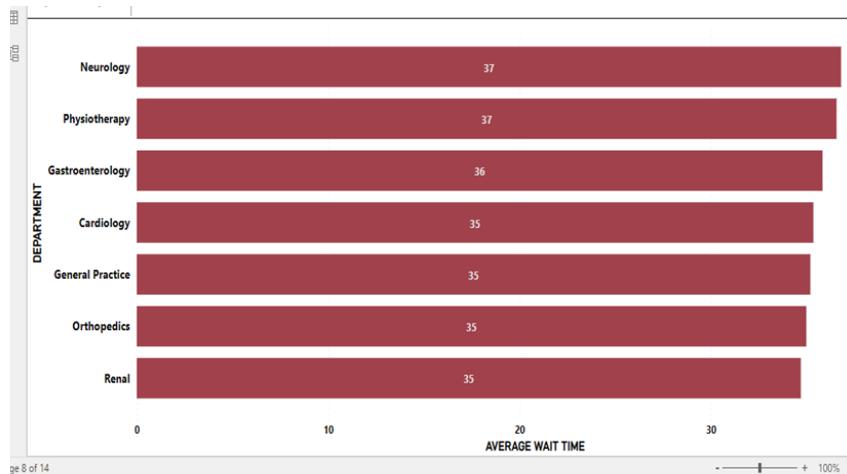
Dax formula - Avg.Wait Time = `AVERAGE('columbia asia hospital'[patient_waittime])`

Measure name = Avg.Wait Time

Aggregate function = `AVERAGE('columbia asia hospital'[patient_waittime])`

AVERAGE WAIT TIME = 35.26

Visualisation method - stacked bar chart



2. Visits by Department Referral: Calculate the total number of visits to each department based on referrals to understand which departments are most frequently visited.

- We are using the dax formula to extract the average wait time of patients. The x axis has the total patients and the y axis has the department.
- **TOTAL PATIENTS;**

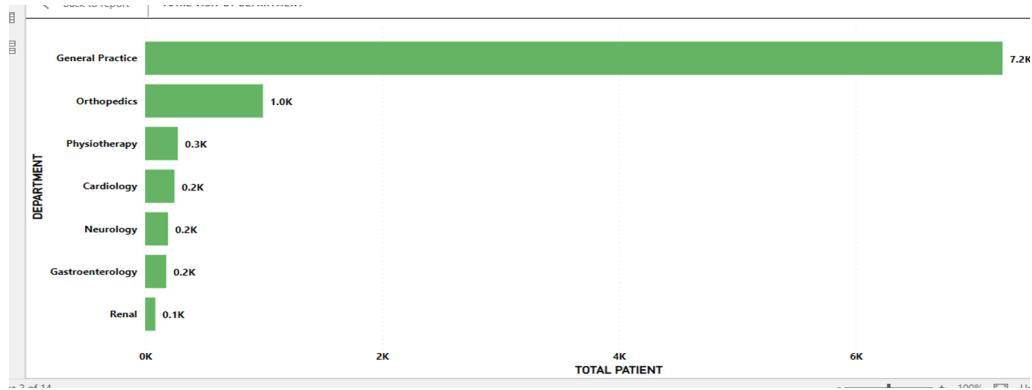
Dax formula - Total Patients = `COUNT('columbia asia hospital'[patient_id])`

Measure name = Total Patients

Aggregate function = `COUNT('columbia asia hospital'[patient_id])`

Total Patients = 9216

Visualisation method - stacked bar chart



3. Segregate patient visits according to different age groups to see which demographics utilise healthcare services the most.

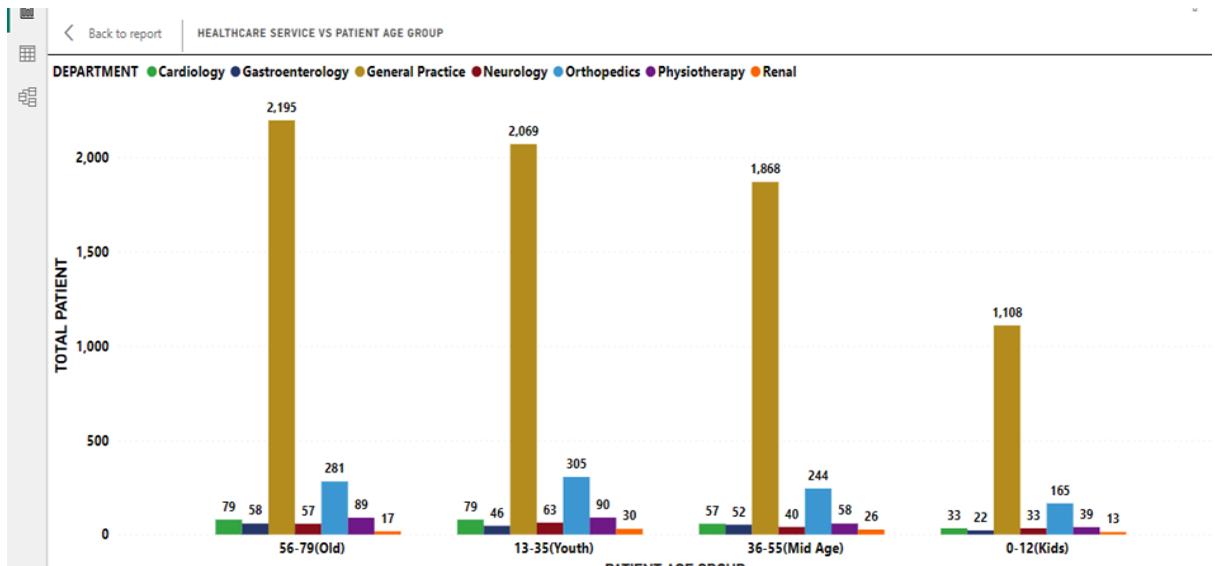
- As the question asks to show the different age groups, people have the most healthcare service.

NEW GROUP FEATURE ; The data has a column of patient age. The age was segregated into four categories using the New Group feature.

- 1 . 1-12 - kids
- 2 . 13-35 - youth
- 3 . 36-55 - mid-age
- 4 . 56-79 - old

- The x axis has the age group and the y axis has the total patients and legend has the department .

Visualisation method - clustered column chart



4. Average Satisfaction by Demographics: Determine the relationship between patient satisfaction scores, their age groups, and racial backgrounds to pinpoint areas for improvement in patient experience.

- As the question asks, show the relationship between satisfaction score, racial backgrounds and age groups.
- The x axis has the avg.sat score and the y axis has the department and legend has the patient race.

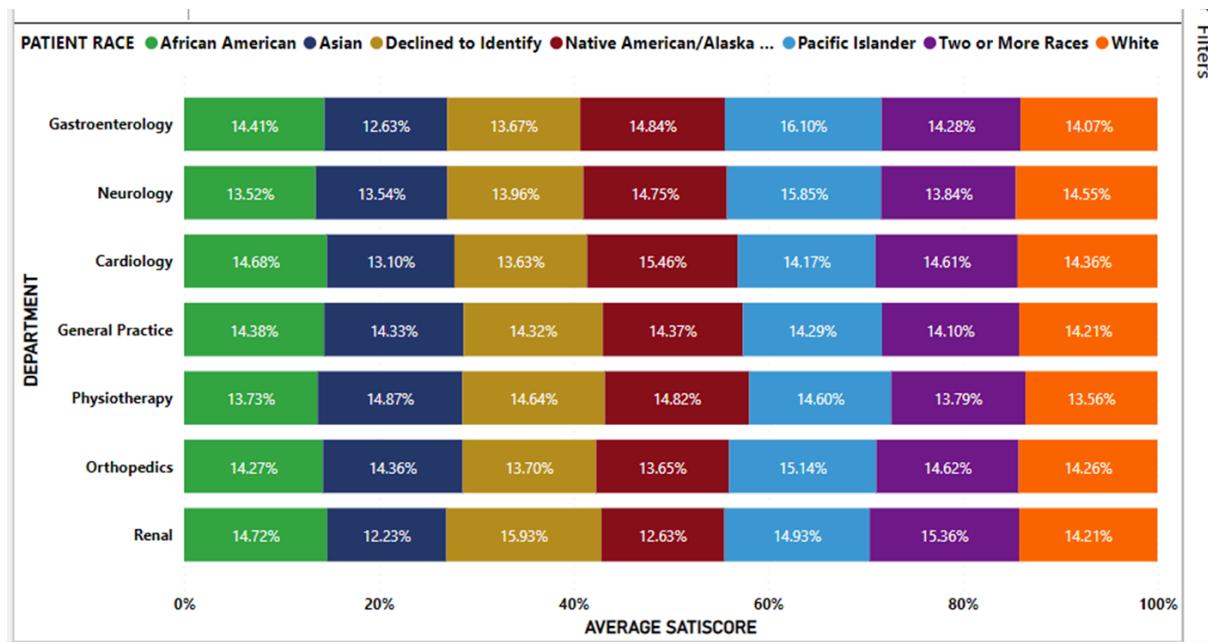
AVERAGE.SATISFACTION SCORE;

Dax formula -`Avg.Satisfscore = AVERAGE('columbia asia hospital'[patient_sat_score])`

Measure name = `Avg.Satisfscore`

Aggregate function = `AVERAGE('columbia asia hospital'[patient_sat_score])`

AVERAGE SATISFACTION SCORE = 5.47



Visualisation method - 100% stacked bar charts

5. The hospital's managing director seeks to evaluate the **revenue of each department** to understand how much revenue is generated by each.

- As the question asks, show the total revenue of each department.
- We should calculate the total revenue using the dax function.

- TOTAL REVENUE**

Dax formula - Total Revenue = `SUM('columbia asia hospital'[Total Bill])`

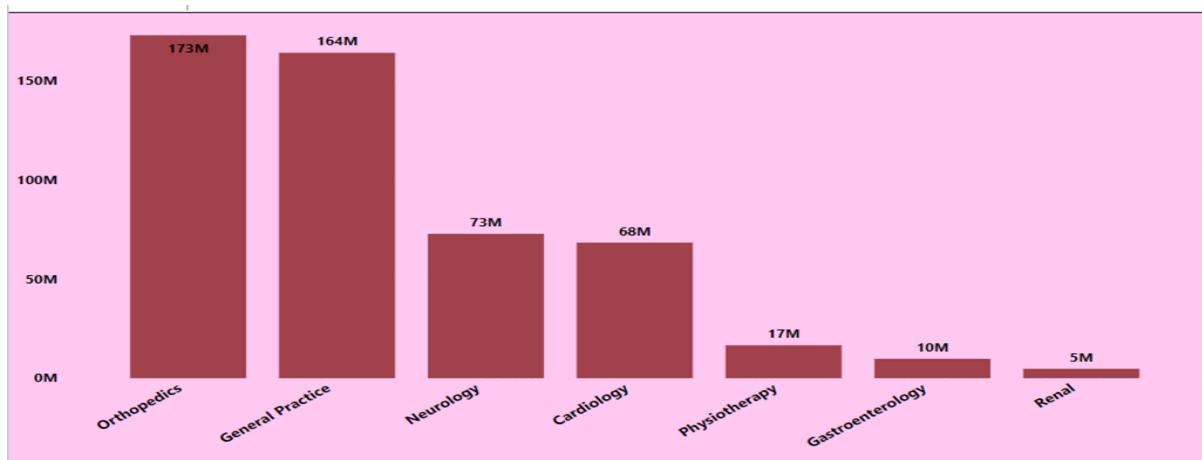
Measure name = Total Revenue

Aggregate function = `SUM('columbia asia hospital'[Total Bill])`

TOTAL REVENUE = 509M

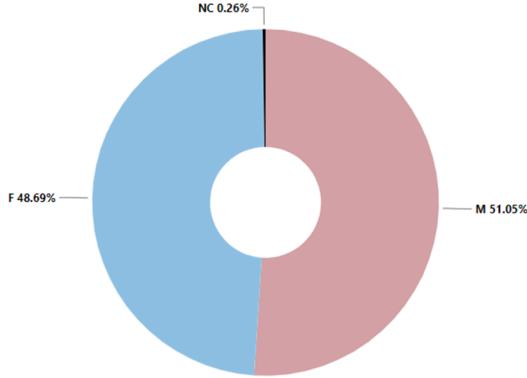
- The x axis has the department and the y axis has the total revenue and legend has the patient race.

Visualisation method - stacked column chart



6. Is there any relation between the number of visits and Gender of the patients.

- As the question asks to show the relationship between number of visits and patient gender.
- We have calculated the total male visits, total female visits using the dax formula.



TOTAL MALE VISITS:

Dax formula - Male Visits = `CALCULATE(COUNT('columbia asia hospital'[patient_gender]),'columbia asia hospital'[patient_gender]="M")`

Measure name = Male Visits

Aggregate function = `CALCULATE(COUNT('columbia asia hospital'[patient_gender]),'columbia asia hospital'[patient_gender]="M")`

Calculate function is used to condition with aggregation.

TOTAL MALE VISITS = 4705.

- **TOTAL FEMALE VISITS :**

Dax formula - Female Visits = `CALCULATE(COUNT('columbia asia hospital'[patient_gender]),'columbia asia hospital'[patient_gender]="F")`

Measure name = Female Visits

Aggregate function = `CALCULATE(COUNT('columbia asia hospital'[patient_gender]),'columbia asia hospital'[patient_gender]="F")`

Calculate function is used to condition with aggregation.

TOTAL FEMALE VISITS = 4487

Visualisation method - pie chart

7. Which department is charging the highest appointment fees in general?

- As the question asks to show the highest appointment fees charged by the department.
- The x axis has the appointment fees and the y axis has the total revenue and legend has the department

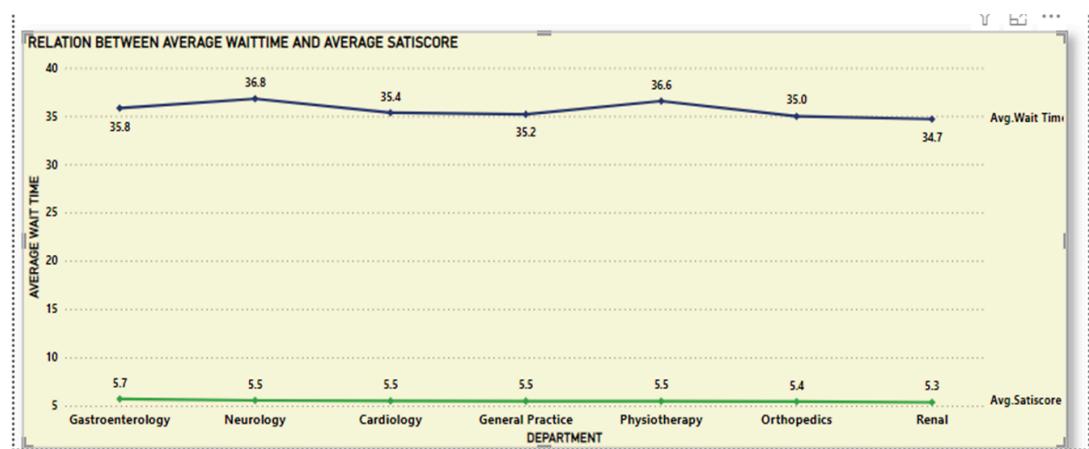
Visualisation method - stacked bar chart



SUBJECTIVE QUESTION

1. What is the relation between patient wait time and satisfaction scores? Investigate whether longer wait times are associated with lower patient satisfaction across various departments.

METHOD USED ; We have calculated the measures avg.wait time, average.satisfaction score. We used a line chart to visualise it. In which rows department and lines are avg.wait time and avg.sat scores.



ANALYSIS; After observation, there is some correlation between average.sat score and avg.wait time in each department. Avg.wait time and avg.sat score varies by department. Although ave. wait time varies in physiotherapy(36.6), general practice(35.2), cardiology(35.4), neurology(36.8) department, the value of average satisfaction score value(5.5) is the same. The avg.sat score value has increased as the patients who waited in each department received satisfactory service relative to the waiting time

Visualisation method - line chart.

2. How do patient demographics affect the frequency of visits to different departments?

- Analyse visit patterns to see if certain age groups or races are more likely to be referred to specific departments.

METHOD USED ; We have calculated the measures of total patients and segregated the age column using the new group features. We have used a chart to show it. The chart contains total patients, age group of patients and department.

ANALYSIS: After observation, the patient demographic affects the frequency of visits to different departments. The different age group patients frequently visited the general practice department. It affected the visits of other departments. The majority of the patients visited the department of general practice. It affected the visits to the renal department. The renal department has a smaller number of patients. It also affects the revenue generation.

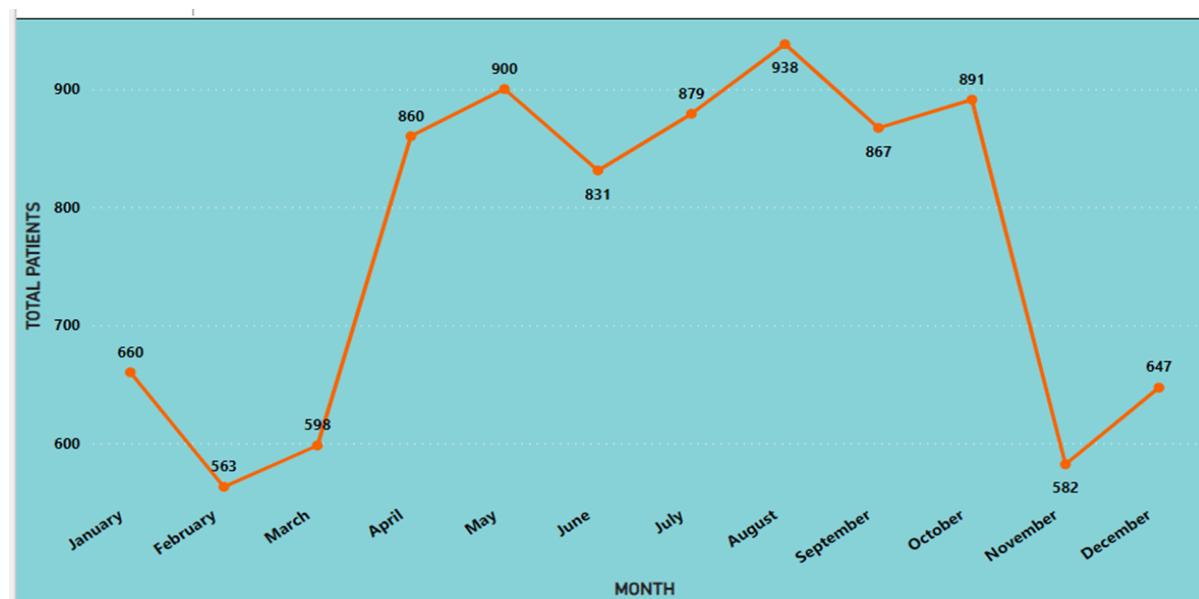


Visualisation method - treemap

3. Is there a noticeable trend in the volume of patient visits throughout the year? Examine patient visit data to identify any seasonal trends or particular months with increased healthcare facility usage.

METHOD USED: We have calculated the measures of total patients and then we have to calculate the month wise patients visits using the date column. We have used a chart to show it. The chart contains total patients,date column with month. The x axis has a month column and the y axis has total patients.

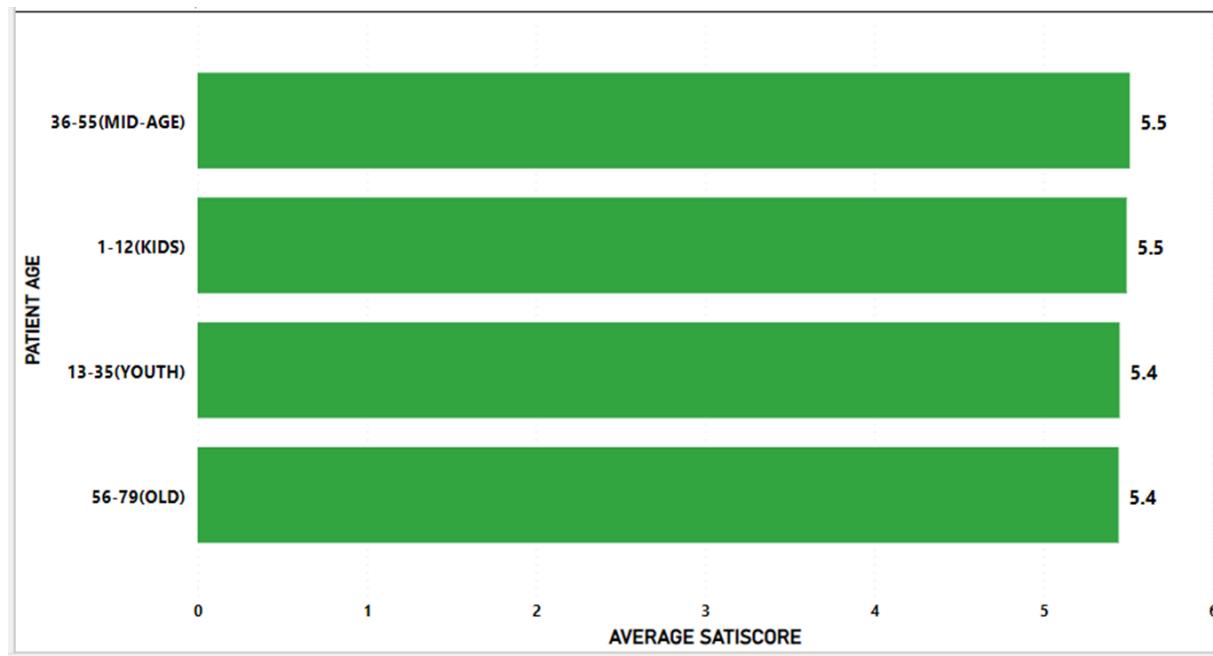
ANALYSIS: After observation, the patient demographic visits count increased in the month of August. And the patient count decreased in the month of February. 938 patients visited in the month of August, and 563 patients visited in the month February.



4. Which age groups report the highest and lowest satisfaction scores? Calculate the average satisfaction scores within each age group to identify which age demographics report the best and worst experiences.

METHOD USED: We have calculated the measure of avg.sat score and then we segregated the age column into 4 groups. Namely 1-12(kids),12-35(youth),36-55(mid-age),56-79(old).We have used a chart to show it. The chart contains avg.sat scores, different age groups. The x axis has a avg.sat score column and the y axis has an age group column.

ANALYSIS: After observation, the mid age(36-55) patients presented their best experience with the highest sat score of 5.51. The old (56-79) presented their least sat score of 5.44.

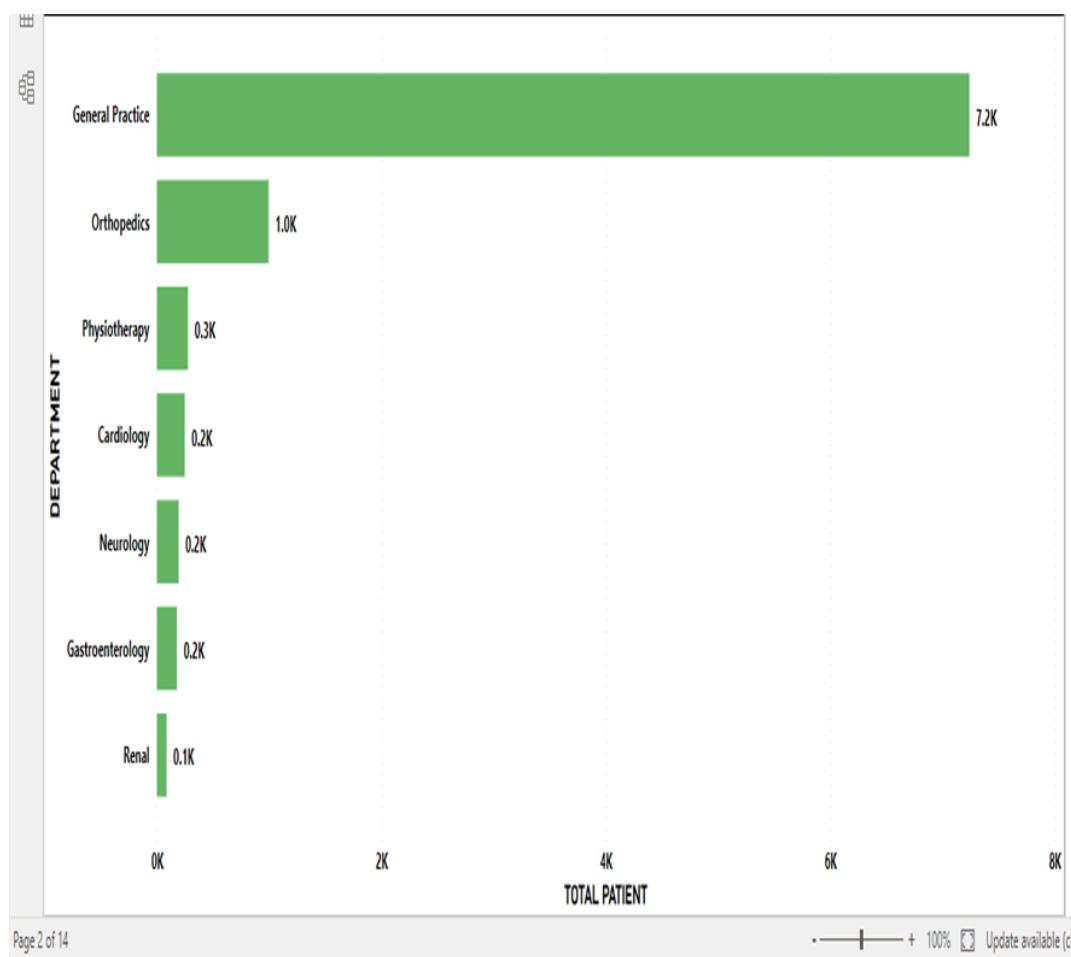


5. The hospital management intends to offer discounts to patients.

- The question arises: how should these bonuses be assigned to patients, on what basis, and why?

➤ **FREQUENCY OF VISITS:** Examine how frequently patients visit the hospital and the nature of their visits (emergency, routine check-ups, treatments, etc.).

- The majority of the patients frequently visited the general practice department. So we should consider the frequency of visits to offer the patients discounts.



➤ **SEASONAL TRENDS** ; Healthcare services often experience fluctuations in demand based on seasons. For instance, flu season typically sees a rise in patients seeking treatment for flu-related symptoms. Understanding these seasonal trends allows healthcare providers to allocate resources effectively and plan staffing levels accordingly.

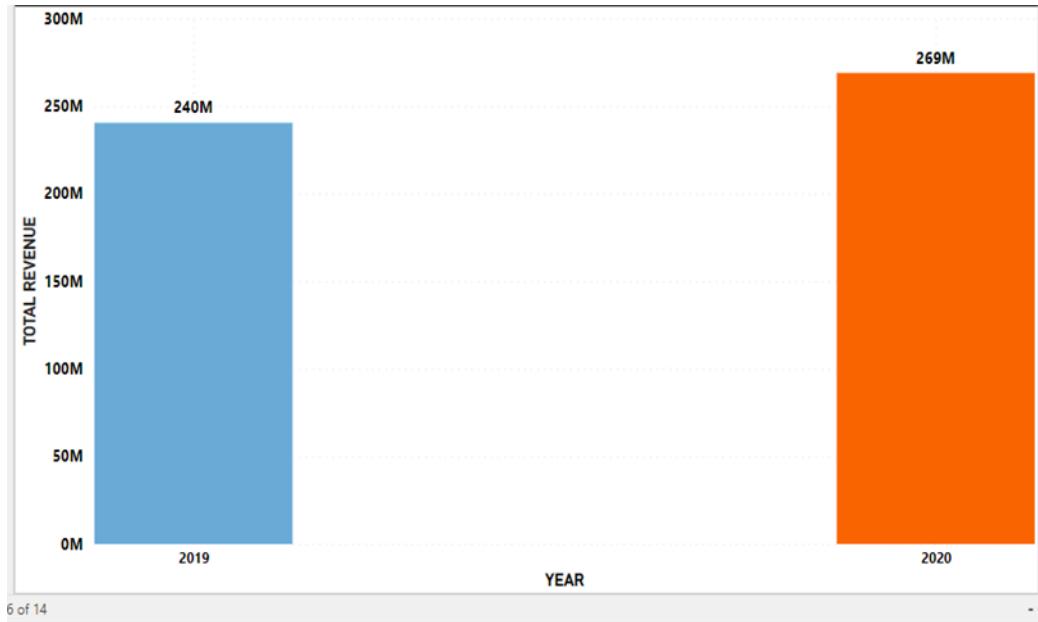


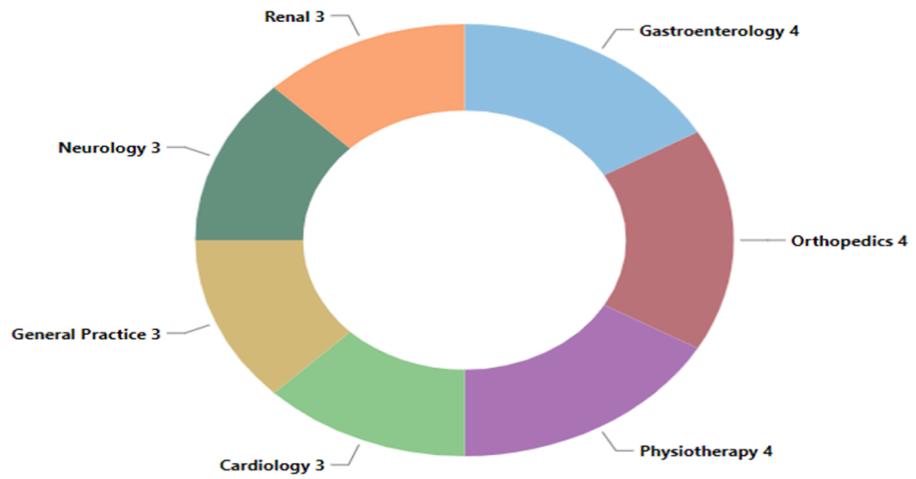
➤ **PATIENT LOYALTY PROGRAM**; Patient loyalty programs are initiatives implemented by healthcare providers to incentivize patients to continue using their services. These programs may offer rewards, discounts, or other benefits to patients who consistently choose a particular healthcare provider or facility for their medical needs.

➤ **HEALTHCARE NEEDS**; The healthcare needs of individuals and communities vary based on factors such as age, gender, socioeconomic status, geographic location, and prevalence of specific health conditions. Understanding and addressing these needs is essential for designing effective healthcare delivery systems and interventions.

➤ **FINANCIAL SITUATION OF PATIENTS;** The financial situation of patients can significantly impact their access to healthcare services and their ability to afford necessary medical treatments. Factors such as health insurance coverage, out-of-pocket expenses, and socioeconomic status influence patients' financial capabilities and healthcare decision-making.

6. The hospital has a budget to hire 2-3 new doctors. They have asked for your suggestions in which departments they should hire.

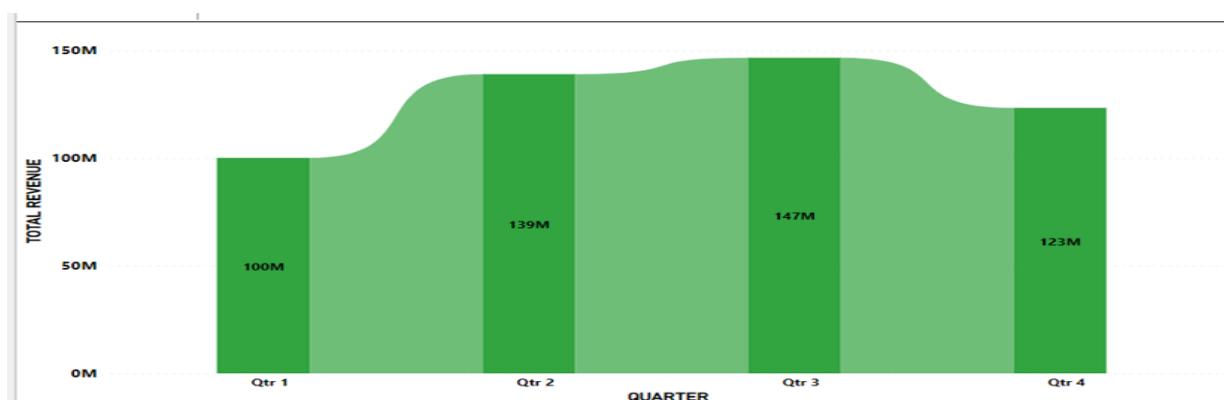
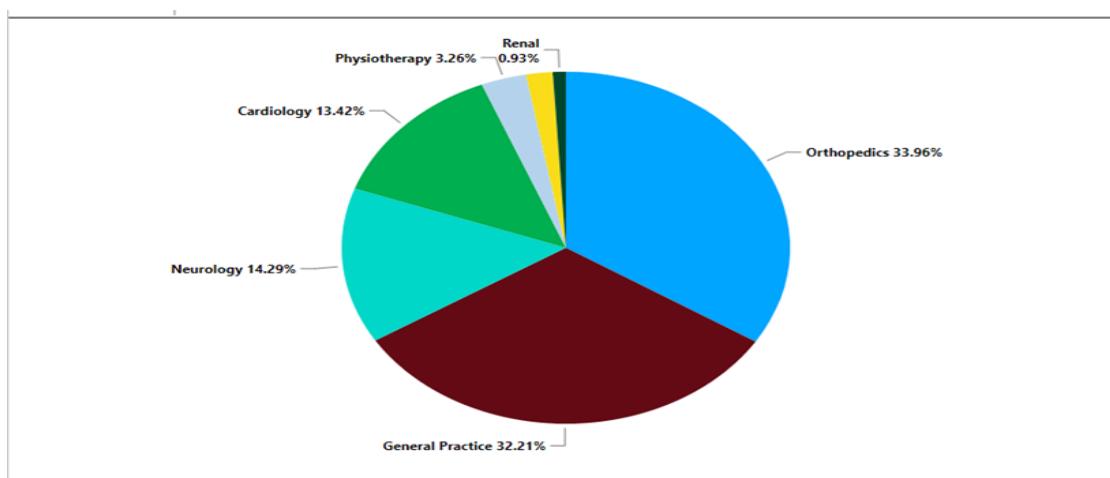




- Yes. The hospital has a budget to hire new doctors in the respective department. We have shown the chart of annual revenues , in the year 2019 the hospital has a revenue of 240 million. But in 2020 the hospital has revenue of 269 million.
- We have Suggested the department of General Practice department . Because the Most patients Frequently visited the General practice department. The department needs more doctors for the Patients Good experience with the hospital.
- Also consider the Orthopaedics department, because the department generated the highest revenue to the hospital. It helps the hospital's Revenue generation.

6. Is the hospital profitable?

- We have shown the revenue in year, quarter and department vise. We have used charts like pie charts,column charts, and ribbon charts.

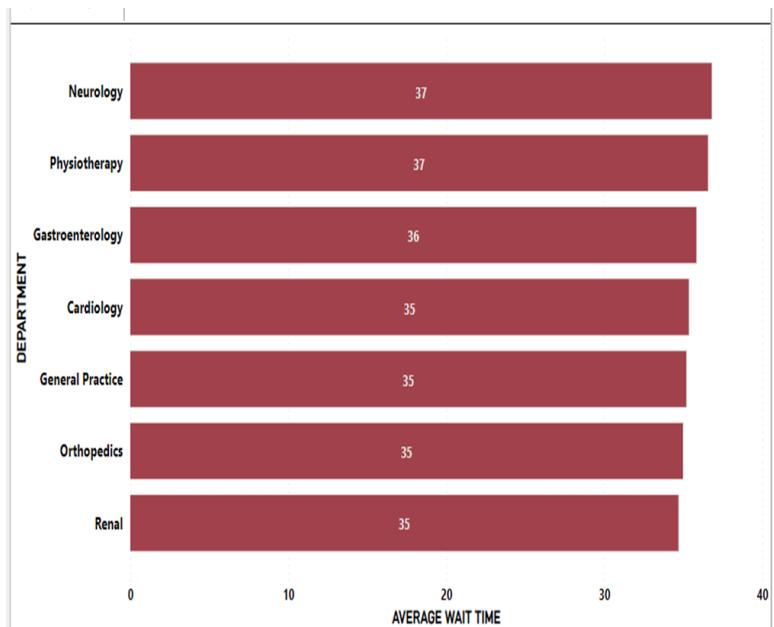


- The orthopaedics department generated the highest revenue of 33.96% to the hospital.
- The revenue by year shows the hospital profitable or Not profitable. Because in the year 2019, the hospital will have a profit of 240 million. But in the year 2020, the hospital will have a profit of 269 million.
- So , the hospital is profitable , and running successfully.

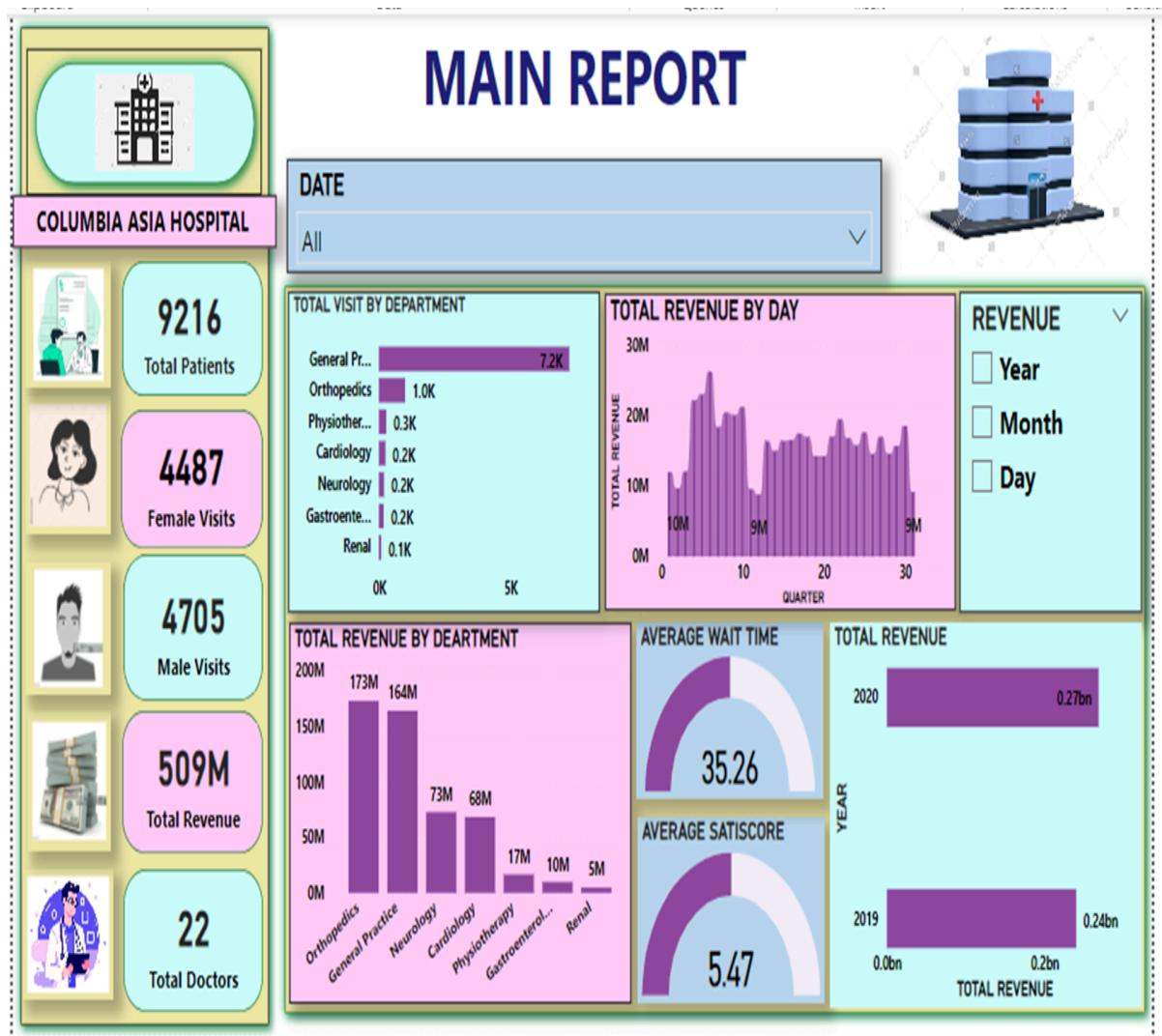
8. Any Department for which the waiting time is oddly large?

METHOD USED; we have calculated the measured average wait time using the column patients wait time .We have shown it in the chart. The x axis have avg wait time and the y axis have department.

ANALYSIS; after analysis, the neurology department has the maximum wait time of patients is 36.80. The renal department has a minimum wait time of 34.70.

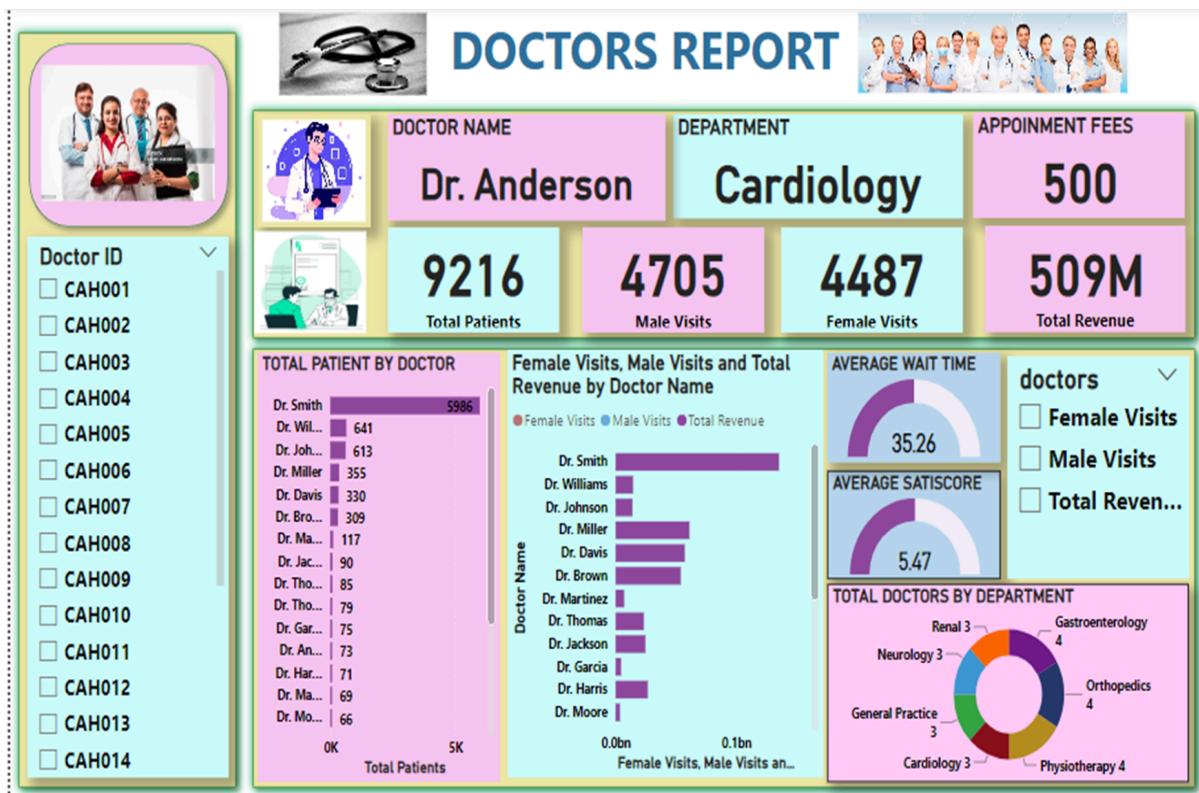


MAIN TAB



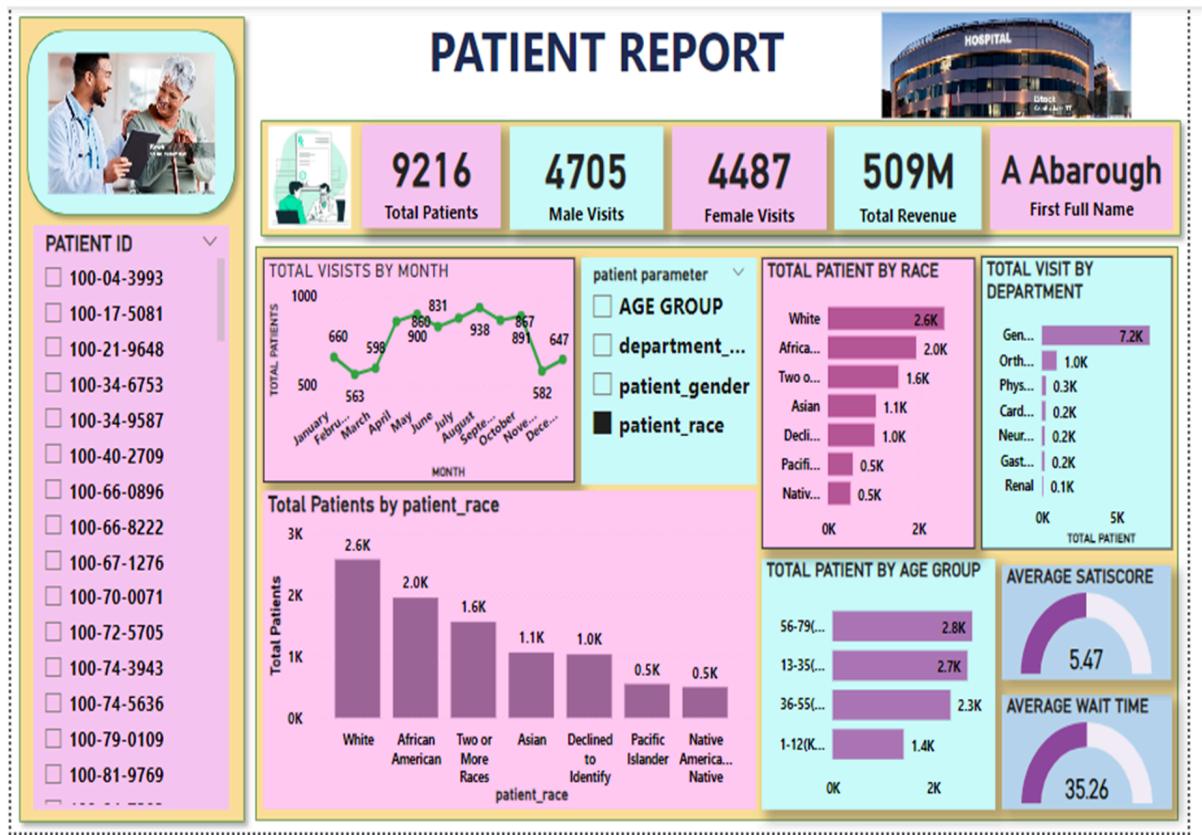
Field parameters: we have used the field parameters to point the revenue in the main tab. The parameters have year,month,day wise revenue.

DOCTORS REPORT



Field parameters: we have used the field parameters to point the doctors in the doctors tab. The parameters have the details of doctors who attend the patients, gender, and generate revenue.

PATIENTS TAB



Field parameters: we have used the field parameters to point the patients in the patients tab. The parameters have department, patient race, age group, gender wise patients details.