COLUMBIA ASIA HOSPITAL DATA ANALYSIS PROJECT-POWER BI

Prateek Thakur

Columbia Asia Hospital Data Analysis

Objective Questions:

1. In analysing the hospital dataset with Power BI, ensure data cleaning to address inconsistencies and missing values before further analysis.

    Solution: To enhance the efficiency of data analysis, I implemented the following transformations on the dataset:

    - The dataset and header names have been corrected to enhance readability.
    - Appropriate data types have been assigned to all columns based on the nature of the values they store.
    - For handling missing values in the "patient_sat_score" column, I utilized the fill-down method to populate values in adjacent empty cells.
    - To improve data readability, I divided Date and Time values into separate columns.
    - In the "Patient Gender" column, I replaced 'M' with 'Male' and 'F' with 'Female'.
    - I combined the Patient's First and Last Name into a single cell to obtain the complete Patient's name.
    - Patient Age was categorized into different age groups using DAX.
    - Satisfaction Level was assessed based on the provided satisfaction score using DAX.
    - Wait time was grouped into five categories using DAX.
    - A calculated column for "Revenue from other services" was added, derived from the total bill using DAX.
    - The percentage of Doctor's Appointment fees in Total Revenue was evaluated using DAX as a calculated column.
    - Measures were incorporated to facilitate further analysis.

2. **Assess the Average Waiting Time:** Analyse the patient waits times to identify the average duration a patient spends before receiving care.

    Solution: On average, patients wait for approximately 35.26 minutes before receiving care.

    ```
    Average Wait time (in min) = AVERAGE ('Hospital Patient dataset'[Patient Waittime])
    ```

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

    Solution: The General Practice department, with 7240 patients, records the highest number of patient visits based on referrals, while Orthopaedics, with 995 patients, ranks as the second most visited department.
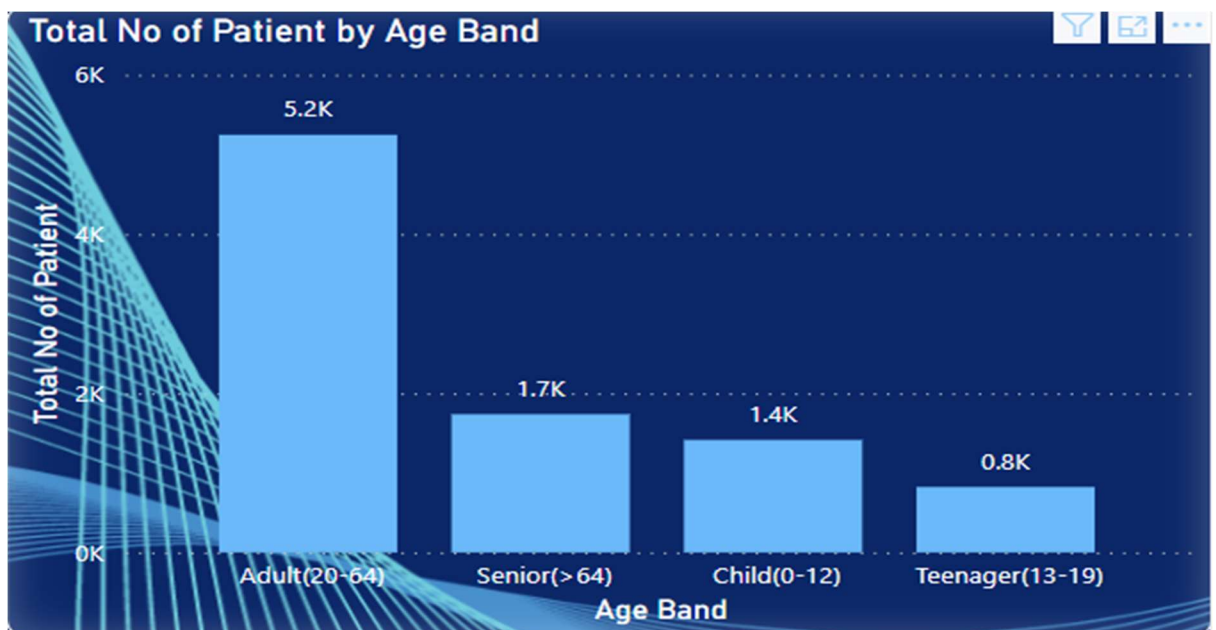
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Following graph shows no of patients visited based on department referrals for all the department.
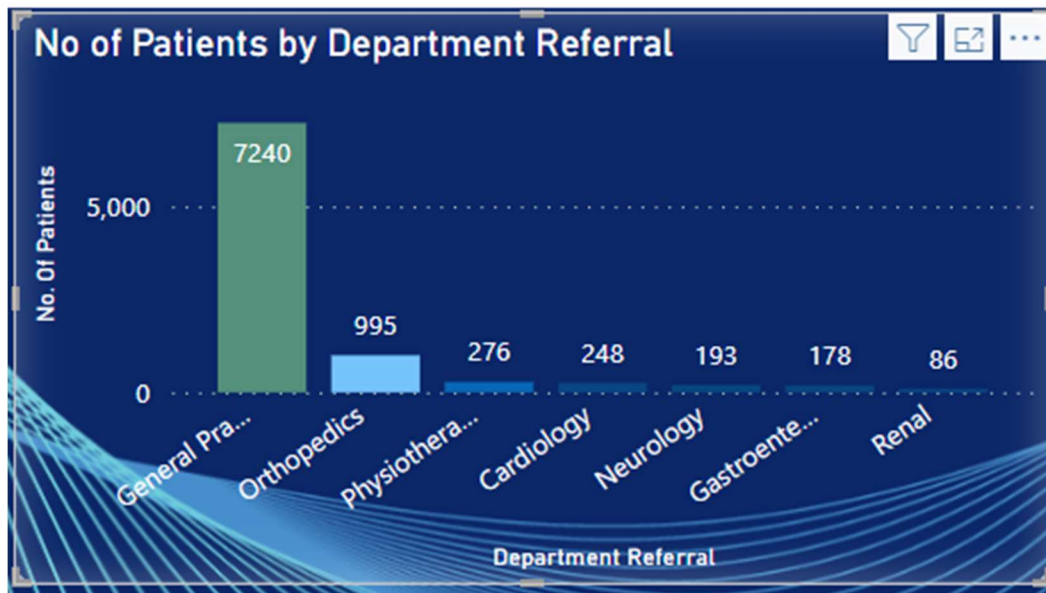
4. **Patient Visits by Age Group:** Segregate patient visits according to different age groups to see which demographics utilize healthcare services the most.

Solution: Based on the current data from Columbia Asia Hospital, the age group with the highest number of patient visits is adults (20-64 years).

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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.

Solution: The given data provides a breakdown of patient satisfaction levels across different demographic groups in Columbia Asia Hospital. The data is categorized by ethnicity and age group. Here is a summary of the total number of patients in each satisfaction category:

Ethnicity	Dissatisfied	Neutral	Satisfied	Grand Total
African American	905	533	513	1951
Asian	469	279	312	1060
Declined to Identify	474	278	278	1030
Native American/Alaska Native	217	146	135	498
Pacific Islander	234	160	155	549
Two or More Races	692	423	442	1557
White	1191	711	669	2571
Grand Total	4182	2530	2504	9216

Ethnicity	Dissatisfied	Neutral	Satisfied	Grand Total
White	1191	711	669	2571
Adult (20-64)	662	412	392	1466
Child (0-12)	178	105	99	382
Senior (>64)	233	127	131	491
Teenager (13-19)	118	67	47	232

Demographic breakdowns by ethnicity and age group are provided for each satisfaction category. The highest count of dissatisfied, neutral, and satisfied patients is observed in the "White" ethnicity group. The "Adult (20-64)" age group consistently has the highest number of patients across all ethnicities. Overall, the data suggests variations in patient satisfaction levels based on both ethnicity and age group.

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

   Solution: The Orthopaedics department generates the highest revenue, amounting to INR 172,939,773, while the General Practice department, with a revenue of INR 164,070,816, secures the second position in revenue generation.

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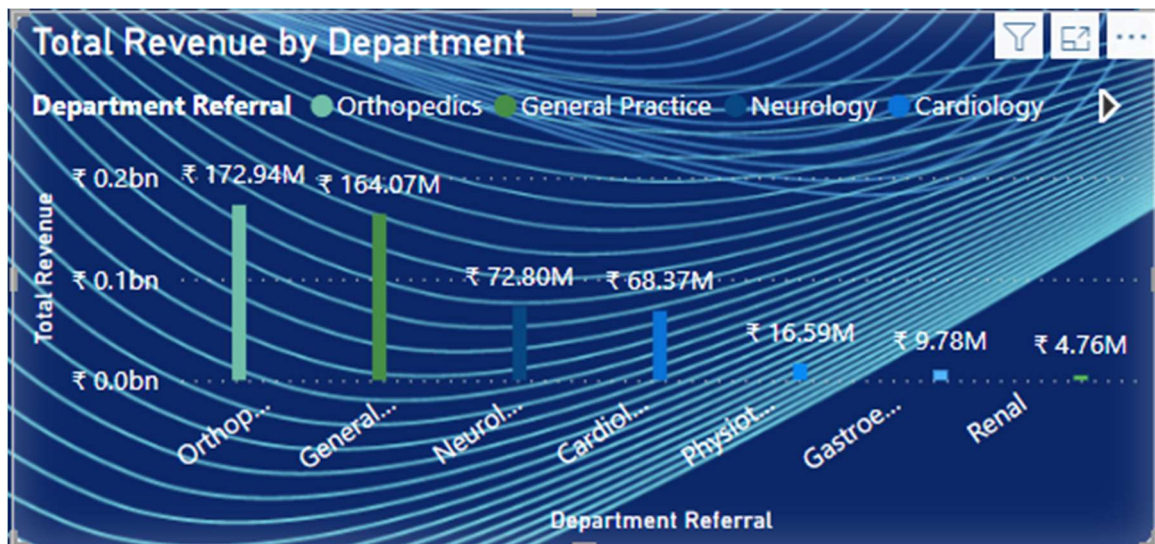
6. Is there any relation between the number of visits and the Gender of the patients?

   Solution: The current data suggests that the highest number of patient visits, totalling 4705, are associated with the male gender.
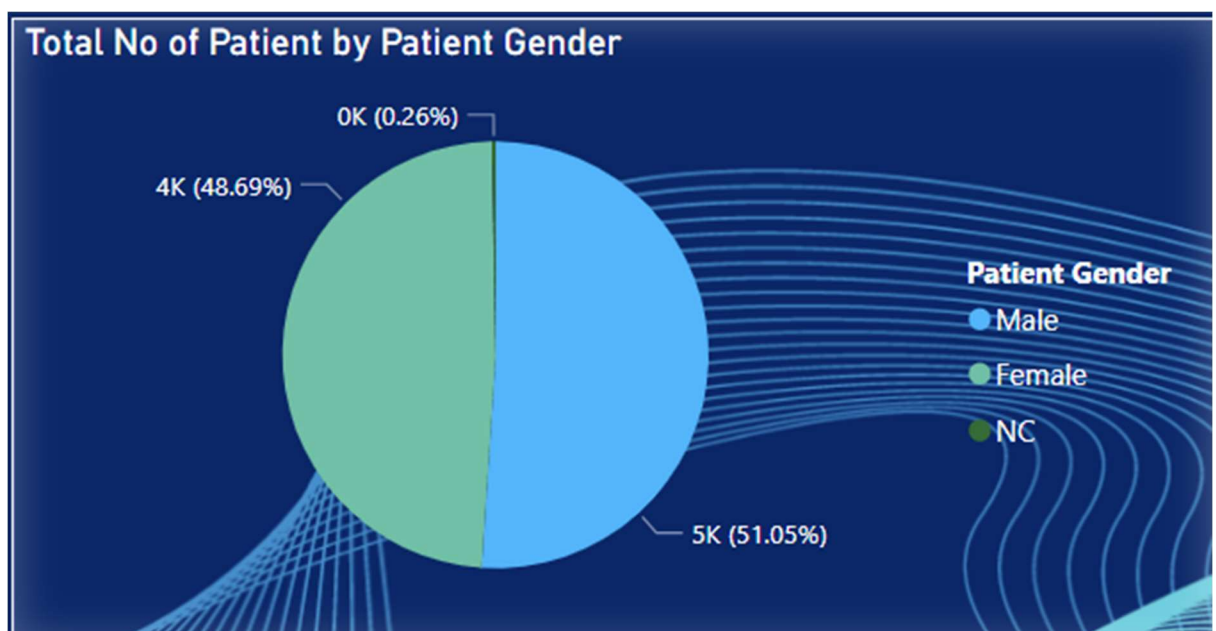
7. Which department is charging the highest appointment fees in general?

   Solution: Neurology is the department the highest appointment fee of INR 1500.

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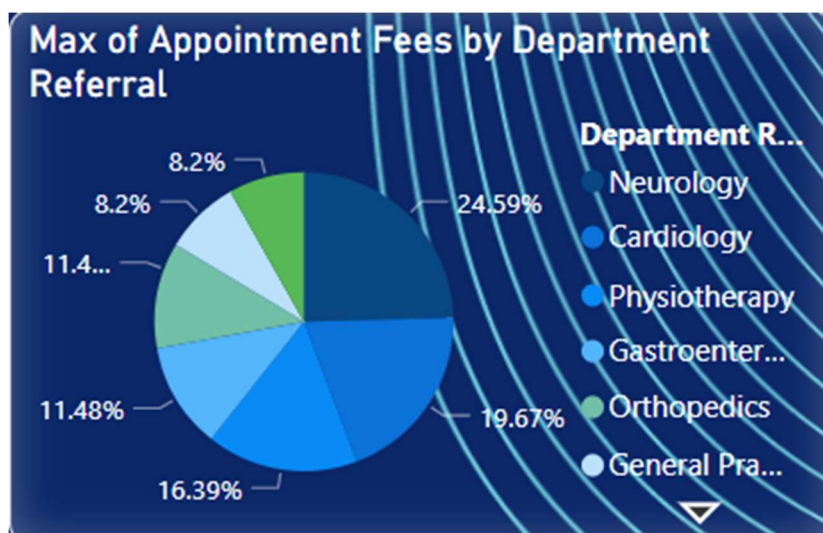

Department Referral	Max of Appointment Fees
Neurology	₹ 1,500
Cardiology	₹ 1,200
Physiotherapy	₹ 1,000
Gastroenterology	₹ 700
Orthopaedics	₹ 700
General Practice	₹ 500
Renal	₹ 500

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Subjective Questions:

1. **What is the relation between patient wait time and satisfaction scores?**

   Solution: There is a direct correlation between patient wait time and satisfaction scores. An increase in waiting time corresponds to an increase in dissatisfaction scores.
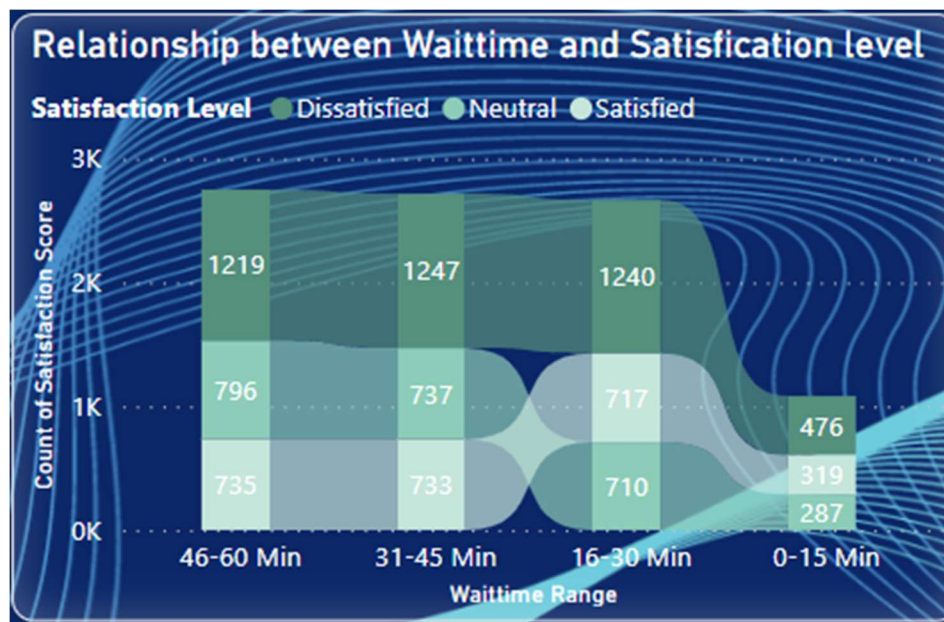
2. **How do patient demographics affect the frequency of visits to different departments?**

   Solution: The General Practice department records the highest number of visits from patients of the White race. Moreover, when considering the overall data, patients of the White race emerge as the most frequently visited across all departments.

Patient Race	Cardiology	Gastroenterology	General Practice	Neurology	Orthopedics	Physiotherapy	Renal	Grand Total
White	62	39	2015	45	305	81	24	2571
African American	51	38	1512	40	229	59	22	1951
Two or More Races	48	28	1258	26	152	37	8	1557
Declined to Identify	26	29	809	30	90	35	11	1030
Asian	26	20	827	22	115	38	12	1060
Native American/Alaska Native	18	10	390	16	53	6	5	498
Pacific Islander	17	14	429	14	51	20	4	549

3. **Is there a noticeable trend in the volume of patient visits throughout the year?**

   Solution: Certainly, there has been a sudden increase in the number of patient visits from April to October. Patient volume is relatively lower during January to March and in November to December.

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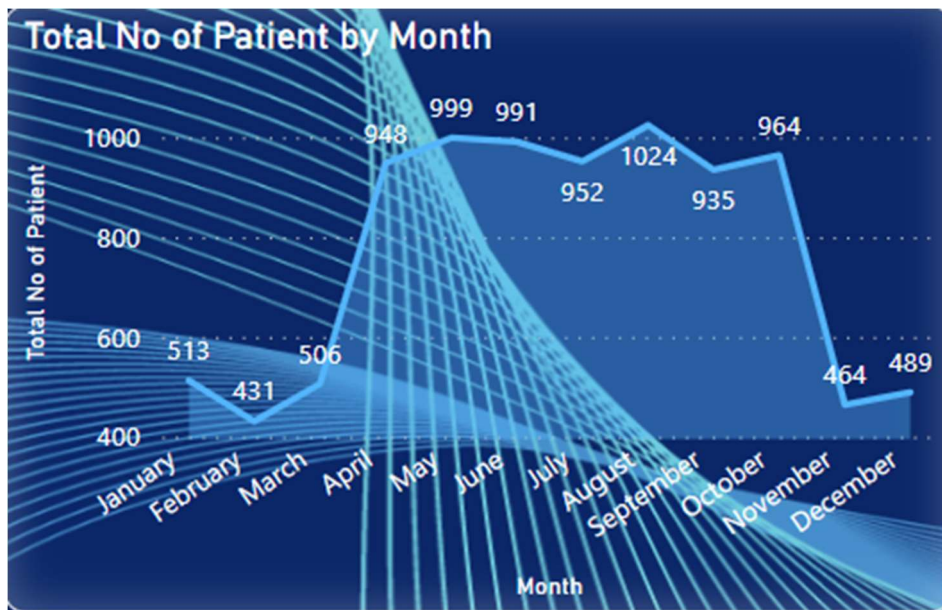
4. **Which age groups report the highest and lowest satisfaction scores?**

   Solution: The age range from 20 to 64 years exhibits the highest level of satisfaction scores.
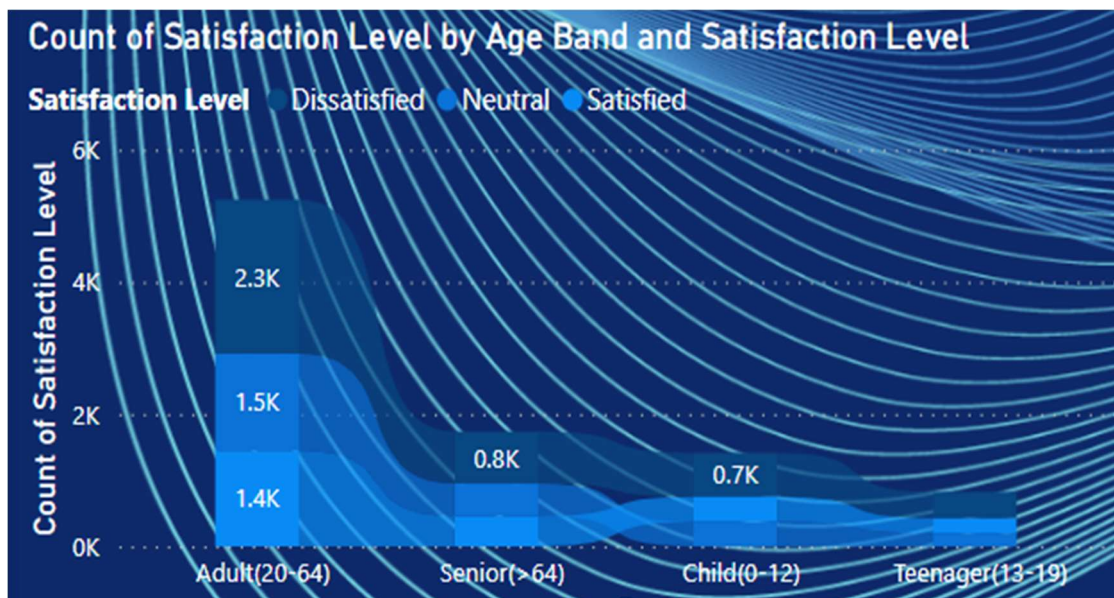
5. **The hospital management intends to offer discounts to patients.**

   Solution: Taking into account that patients of the White race, aged between 20 and 64 years, are the most frequent visitors, it might be beneficial to contemplate providing discounts or loyalty programs for these patients. Such initiatives can contribute to improved patient retention and satisfaction.

   As an alternative approach, the hospital could consider implementing periodic

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discounts or promotions, particularly during specific seasons or months, such as from January to March and November to December. This seasonal strategy has the potential to attract more patients and boost engagement during these months.

Following table shows the Total Number of Patients visits by the Patient Race and Age Group

Patient Race	Adult(20-64)	Child(0-12)	Senior(>64)	Teenager(13-19)	Total
African American	1079	325	379	168	1951
Asian	622	148	192	98	1060
Declined to Identify	590	166	182	92	1030
Native American/Alaska Native	298	79	79	42	498
Pacific Islander	331	72	92	54	549
Two or More Races	859	241	321	136	1557
White	1466	382	491	232	2571
Total	**5245**	**1413**	**1736**	**822**	**9216**

Following graph represent the dip in patient's visit during the month of Jan- March and November-December
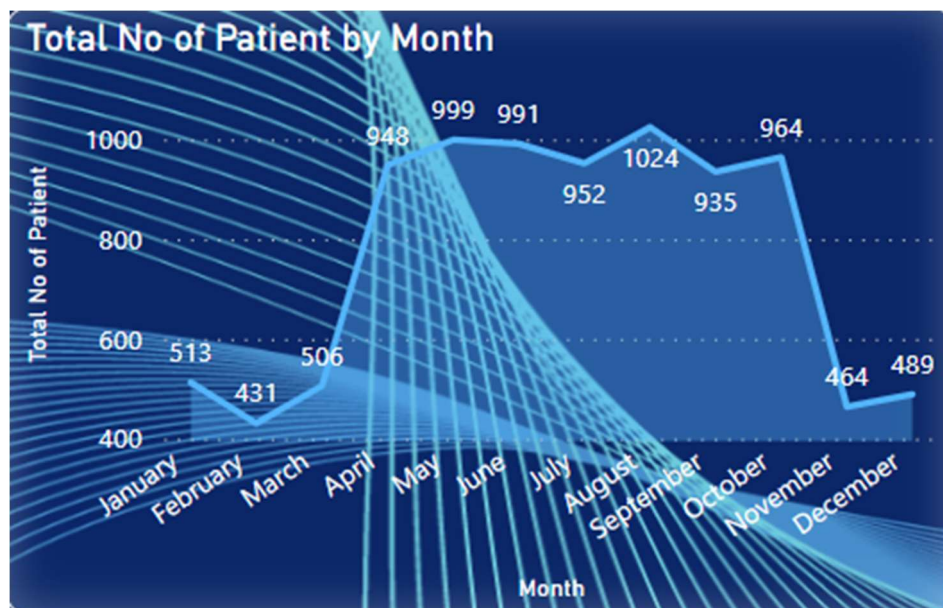
6. **The hospital has a budget to hire 2-3 new doctors.**

   Solution: If the hospital budget permits, it is advisable to explore the option of recruiting additional doctors for the General Practice department. Currently, this department accommodates the highest volume of patients with only three doctors. Increasing the number of doctors is likely to reduce patient wait times, elevate

satisfaction levels, and potentially enhance overall hospital revenue.

Department Name	No Of Doctors	No of Patients	Average Wait time(in min)
General Practice	3	7240	35
Orthopedics	4	995	35
Physiotherapy	4	276	37
Cardiology	3	248	35
Neurology	3	193	37
Gastroenterology	4	178	36
Renal	3	86	35
Total	**22**	**9216**	**35**

7. **Is the hospital profitable?**

   Solution: Analysing the hospital's profitability is challenging with the current dataset. While the dataset indicates the total revenue generated by the hospital, a comprehensive analysis of profit and loss requires the consideration of hospital expenses.

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

   Solution: In general, the maximum wait time for patients is 60 minutes across all departments. On average, patients experience a waiting time of 37 minutes in Neurology department, which is notably high compared to other departments.

Department referral	Min of Patient Waittime	Average Wait time(in min)	Max of Patient Waittime
Neurology	10	37	60
Physiotherapy	10	37	60
Gastroenterology	10	36	60
Cardiology	10	35	60
General Practice	10	35	60
Orthopedics	10	35	60
Renal	10	35	60
Total	**10**	**35**	**60**

9. **Come up with strategies to provide discounts to the patients.**

   Solution: Below are few strategies to provide the discounts to the patients:
   - Offer discounts to patients who settle their bills promptly or within a specified time frame. This can encourage timely payments and improve cash flow.
   - Introduce bundled packages for specific services or treatments at a discounted rate. This provides value to patients and encourages them to

choose comprehensive care options.
- Consider offering discounts or loyalty programs for patients who frequently visit the hospital. This can enhance patient retention and satisfaction.
- Provide special discounts for senior citizens, acknowledging their healthcare needs and promoting loyalty among this demographic.
- Create a referral program where existing patients who refer new patients receive discounts on future services. This can help in patient acquisition and retention.