Columbia Asia Hospital Analysis

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About Coloumbia Asia Hospital

- Columbia Asia Hospital is a leading healthcare provider known for its multi-specialty services and patient-centric approach.

- With an increasing patient base and growing operations, the hospital aims to enhance both financial performance and service quality through data-driven insights.

Problem Statment

Columbia Asia Hospital aims to leverage data analytics to gain deeper insights into its operations and improve overall performance.

The key focus areas include:

- **Revenue Analysis:** Understanding how different departments contribute to the hospital's total revenue.

- **Workforce Planning:** Identifying departments that require additional staffing based on patient flow and service demand.

- **Discount Strategy:** Developing effective discount policies to enhance patient satisfaction while maintaining profitability.

Objective Of The Analysis

The goal of this analysis is to:

- Analyze hospital data to uncover key business insights.

- Provide data-backed recommendations to help management make informed, strategic decisions.

- Build visual dashboards that simplify complex information and support decision-making.

Data Overview

The data includes two tables:

- **doctor_patients_data**: Details on doctors, patient visits, fees, and satisfaction scores.

- **hospital_er**: Information on patient demographics, wait times, and referrals.

Together, they provide a clear view of hospital performance and patient experience.

Methedology

1. Data Prepration

2. Patient & Department Analysis

3. Financial Insights

4. Recommendations

Department Wise Revenue

Key Insights:

- Orthopedics and General Practice are the top revenue-generating departments, contributing the highest share to the hospital's overall income indicating strong patient demand and service utilization in these areas.

- Renal and Gastroenterology generate the least revenue, suggesting either lower patient inflow or limited service offerings, which may require further review or targeted improvement strategies.

TotalRevenue by department_referral
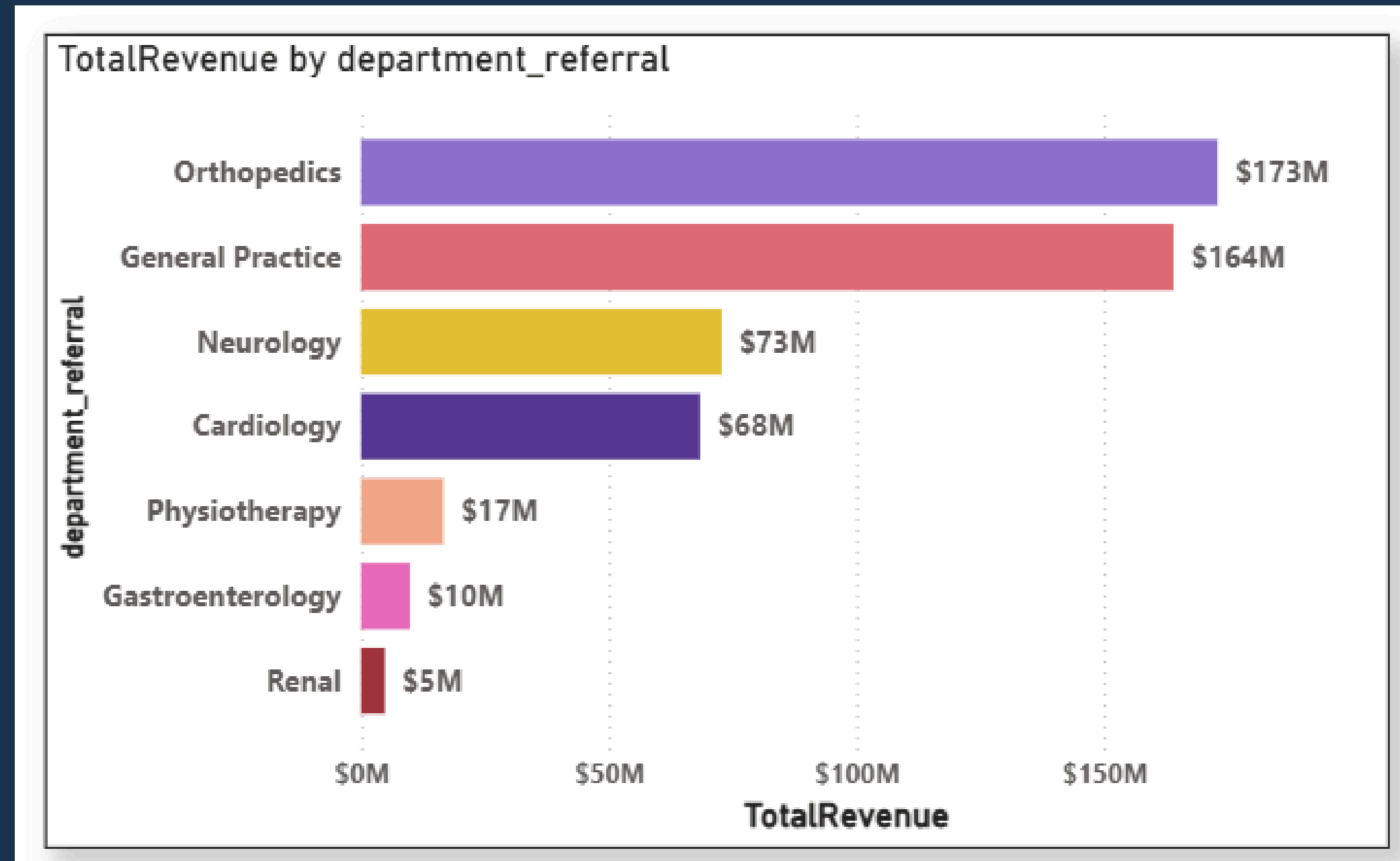
Patient Satisfaction Analysis by Age & Race

Key Insights:

- The numbers look a little low, right? That's because during data cleaning, it was found that around **72%** of patient satisfaction scores were missing possibly due to incomplete survey submissions, unrecorded feedback from emergency visits, or manual entry gaps in the hospital system.

- Even with limited data, we observed that patients aged **18–39** showed slightly higher satisfaction levels compared to other age groups, while racial differences were minimal, indicating fairly consistent patient experiences across demographics
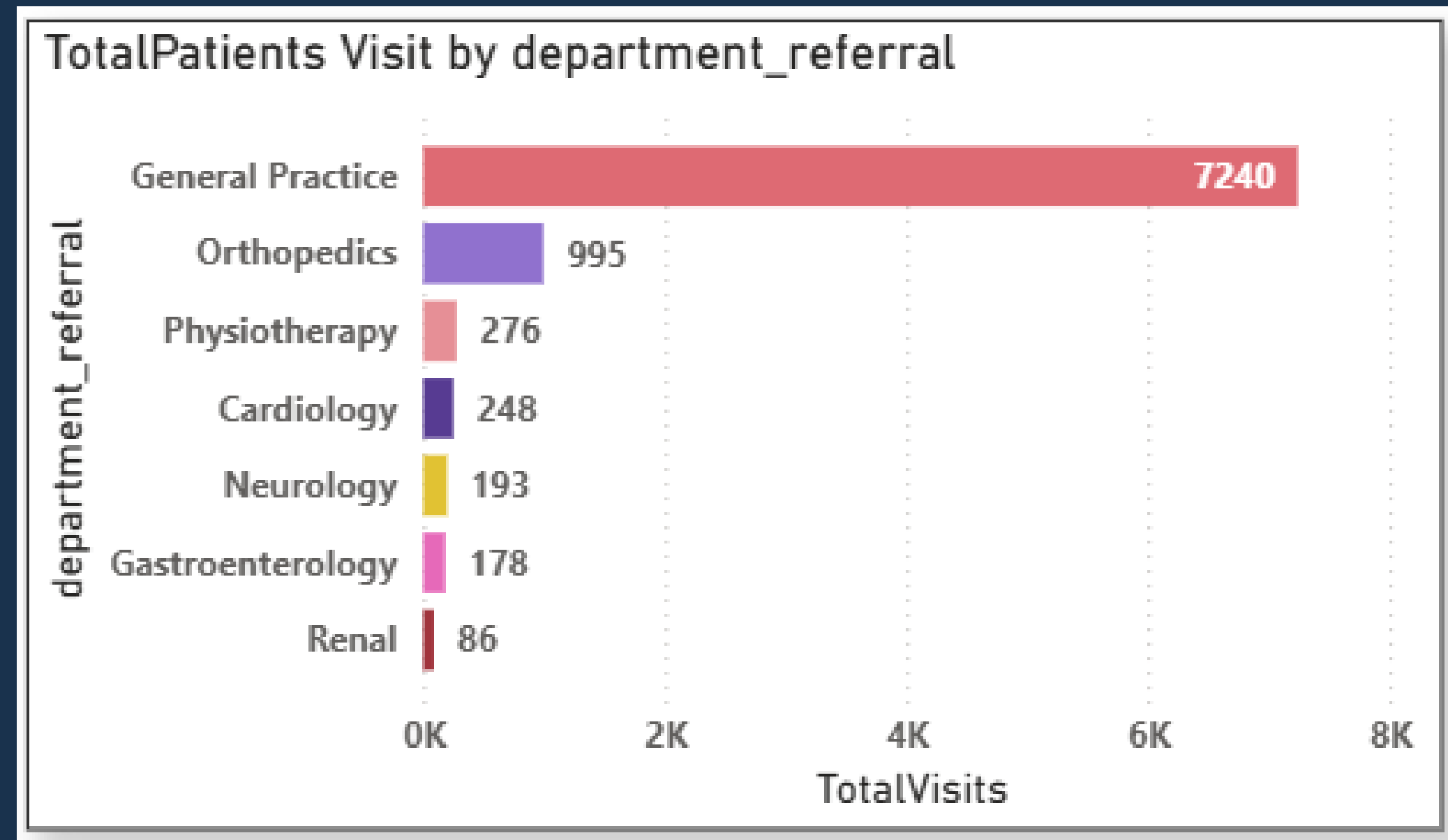

AvgSatScore by AgeGroup & patient_race

patient_race: ● African Am... ● Asian ● Declined t... ● Native Am... ● Pacific Isla... ● Two or Mor... ● White

AgeGroup	African Am...	Asian	Declined t...	Native Am...	Pacific Isla...	Two or Mor...	White
29-39	1.3	1.3	1.2	1.2	1.9	1.2	1.7
18-28	1.3	1.7	1.5	1.7	1.2	1.2	1.3
60-69	1.2	1.7	1.6	1.0	1.3	1.4	1.3
40-59	1.5	1.2	1.3	1.4	1.2	1.4	1.4
0-17	1.3	1.3	1.1	1.7	1.5	1.4	1.4
70+	1.3	1.4	1.4	1.4	1.6	1.0	1.3

AvgAgeGroupSatScore
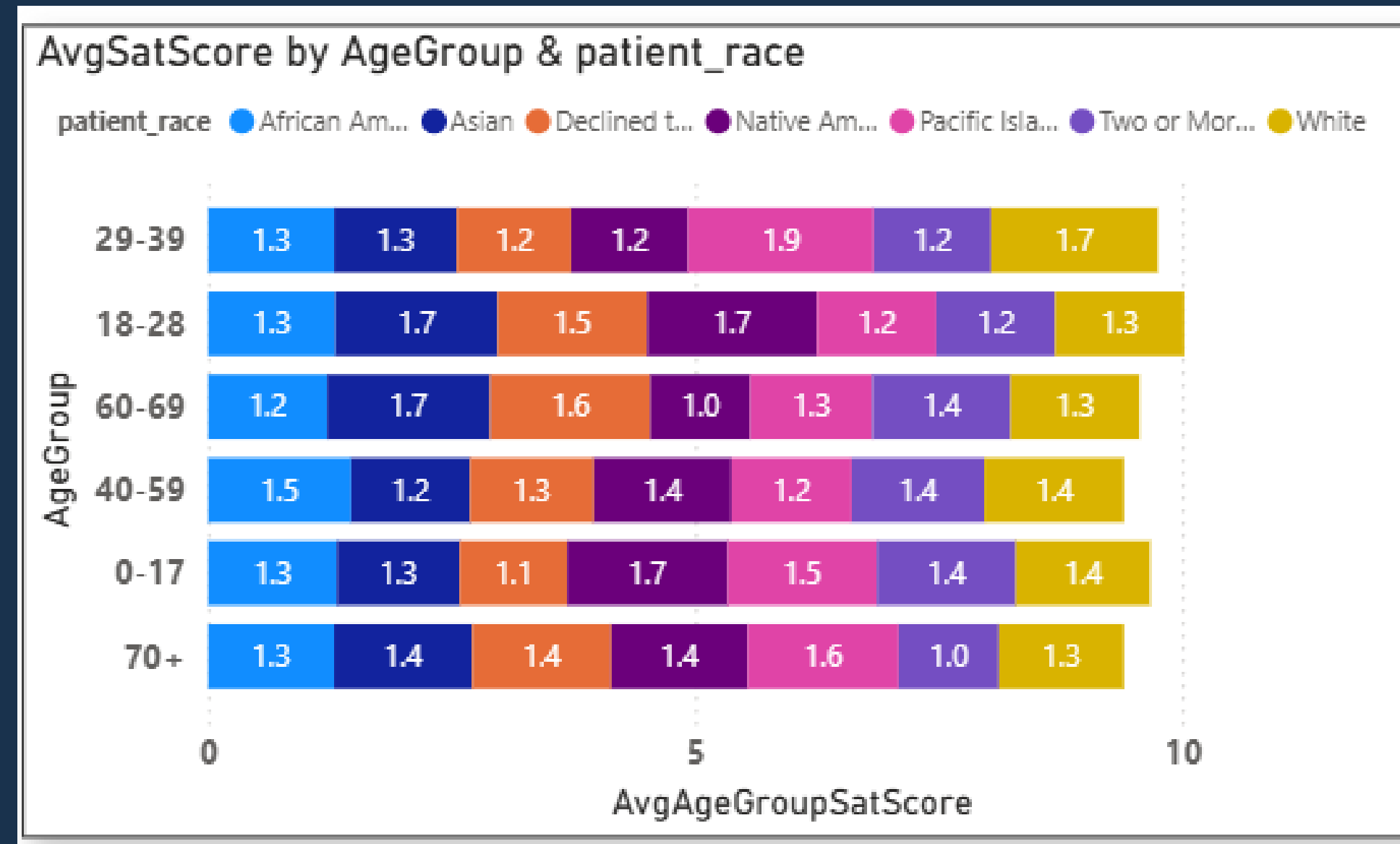
Department Wise Patient Volume
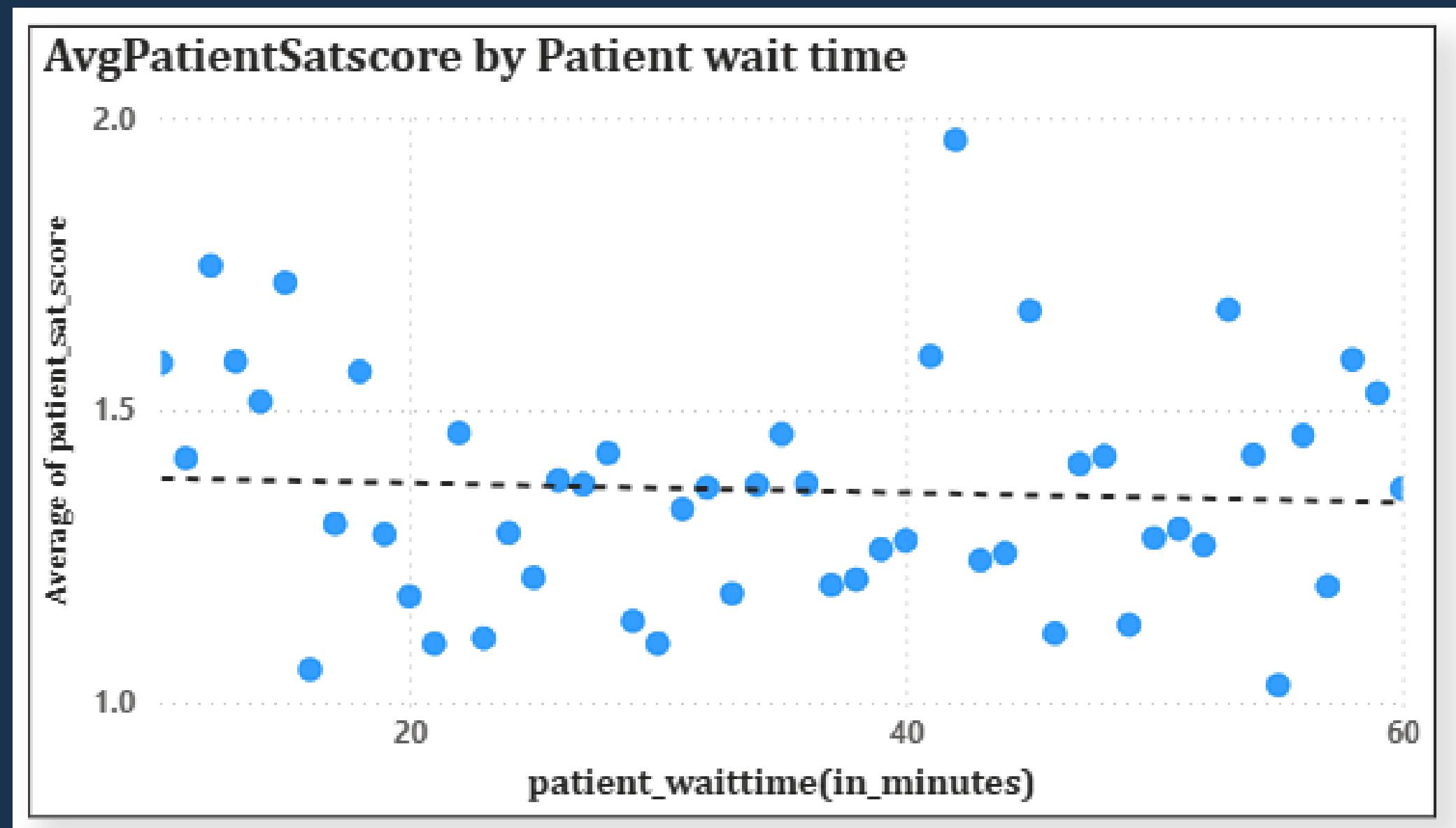
Key Insights:

- General Practice receives the highest number of patient visits (7,240) indicating it is the most frequently consulted and high-demand department in the hospital.

- Departments like Renal and Gastroenterology record the lowest patient volumes, suggesting either limited service utilization or potential areas for improved awareness and outreach.

TotalPatients Visit by department_referral

General Practice — 7240
Orthopedics — 995
Physiotherapy — 276
Cardiology — 248
Neurology — 193
Gastroenterology — 178
Renal — 86

Patient Wait Time vs Satisfaction Analysis

Key Insights:

- The trendline shows a slight negative correlation between patient wait time and satisfaction score, indicating that longer waiting periods generally lead to lower patient satisfaction.

- However, the overall satisfaction scores remain low and scattered, suggesting that factors beyond wait time such as service quality or staff interaction may also influence patient experience.


AvgPatientSatscore by Patient wait time

Discount Allocation Analysis

Key Insights:

- The discount allocation was primarily determined based on age group and revenue contribution, while average satisfaction score was considered only at a group level to maintain fairness and simplicity.

- The majority of patients fall under the Low discount category, indicating strong-performing age groups in terms of revenue, whereas High discounts were assigned to lower-revenue or less-engaged groups to encourage better participation

DiscountAllocation Based on AgeGroup Revenue & Satscore

2307

2652

4257

DiscountCategory
- Low
- Medium
- High
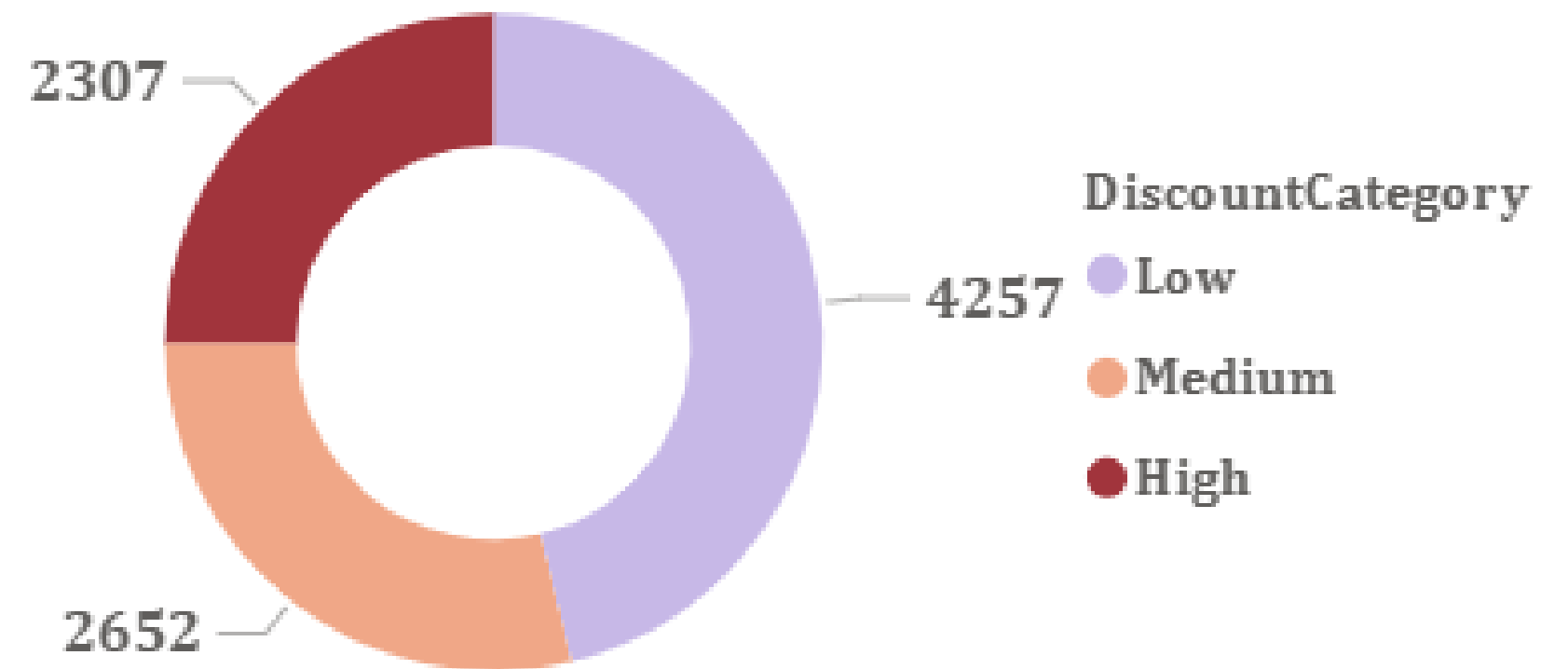
Recommendations

1. Optimize Doctor Allocation Across Departments

   - Increase the number of doctors in high-revenue and high-demand departments to reduce workload and patient wait times.

   - Redistribute staff from low-patient-volume departments to improve efficiency and service utilization.

   - Continuously monitor patient flow trends to plan future hiring and ensure balanced department staffing.

Recommendations

2. Strengthen Patient Feedback and Engagement System

- A large portion of missing satisfaction scores (~72%) indicates the need for a more effective and engaging feedback mechanism

- Develop a simple and engaging feedback mechanism (like digital kiosks or mobile surveys) to reduce missing satisfaction scores.

- Ensure feedback is collected consistently after each visit to capture real-time patient experiences.

Recommendations

3. Refine Discount and Retention Strategies

- Allocate discounts primarily based on age group and revenue contribution, ensuring fairness across patient segments.

- Offer higher discounts to elderly or low-revenue groups to improve accessibility and engagement.

- As satisfaction data improves, incorporate sat_scores into discount logic to reward loyal and satisfied patients effectively

FINAL DASHBOARD(Patient's Tab)

TotalVisits, TotalRevenue and average_wait_time by department_referral

● TotalVisits ● TotalRevenue ● average_wait_time

department_referral	TotalVisits	average_wait_time	TotalRevenue
General Practice	7240	35.20	164M
Orthopedics	995	34.98	173M
Physiotherapy	276	36.57	17M
Cardiology	248	35.35	68M
Neurology	193	36.80	73M
Gastroenterology	178	35.83	10M
Renal	86		5M

TotalVisits, TotalRevenue and average_wait_time
1   10   100   1000   10000   10000…   10000…   10000…   10000…

PatientID
All

Patient Race
- ☐ African American
- ☐ Asian
- ☐ Declined to Identify
- ☐ Native American/Alas…
- ☐ Pacific Islander
- ☐ Two or More Races
- ☐ White

Overall Revenue Of Patient
$509M

No.Of Visits
9216

Avg Satscore
1.36

Total Patient Visit by AgeGroup

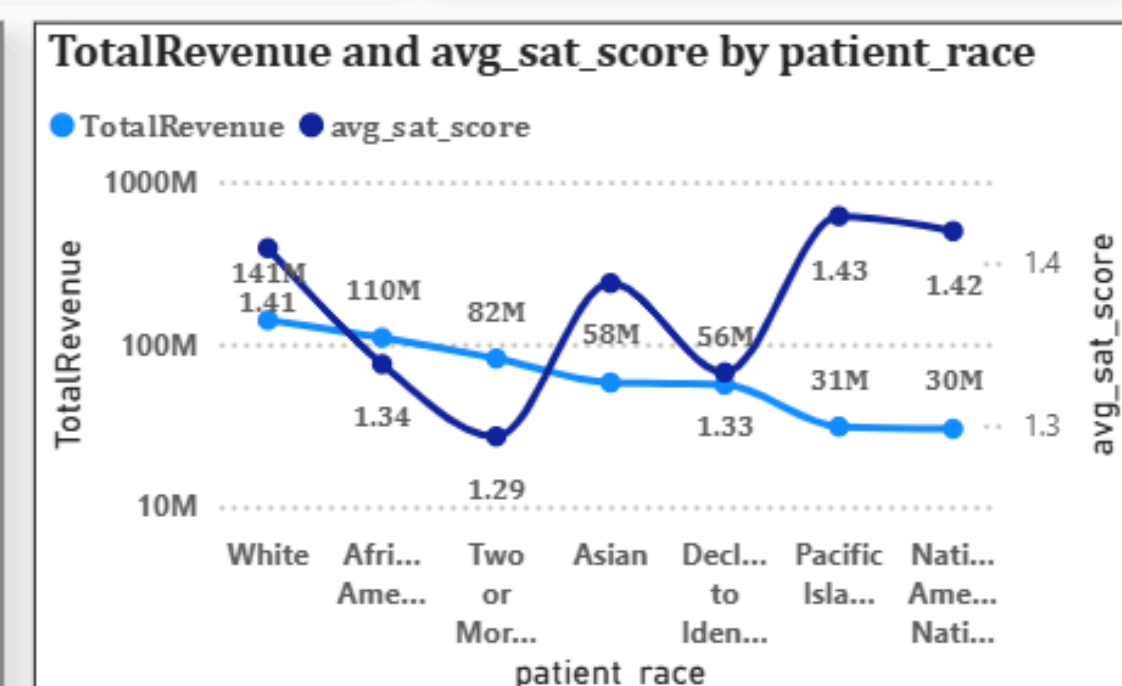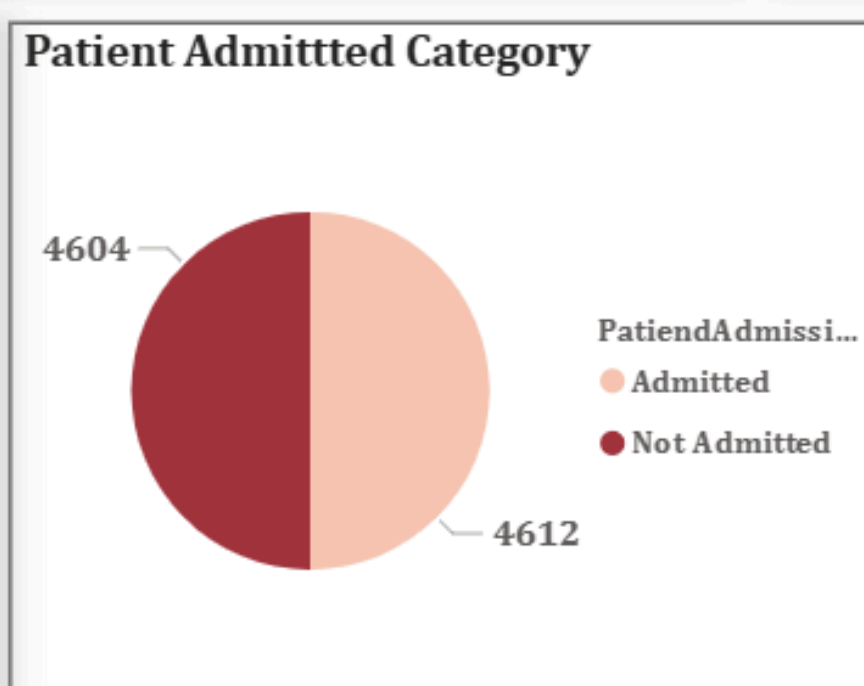| AgeGroup	TotalVisits
40-59	2286
0-17	1971
18-28	1327
29-39	1325
60-69	1154
70+	1153

Patient Admittted Category

4604
4612

PatiendAdmissi…
● Admitted
● Not Admitted

TotalRevenue and avg_sat_score by patient_race

● TotalRevenue ● avg_sat_score

patient_race	TotalRevenue	avg_sat_score
White	141M	1.41
Afri. Ame…	110M	1.34
Two or Mor…	82M	1.29
Asian	58M	1.43
Decl. to Iden…	56M	1.33
Pacific Isla…	31M	1.43
Nati. Ame… Nati…	30M	1.42

CONCLUSION

- Overall, I want to say that Columbia Asia Hospital is performing strongly in terms of revenue generation, with departments like Orthopedics and General Practice leading in both patient volume and financial contribution.

- However, there is scope to optimize staffing by increasing the number of doctors in high-demand departments and redistributing resources where patient inflow is low.

- The hospital should also focus on improving patient feedback collection, ensuring a more engaging and consistent satisfaction tracking system to enhance service quality.

- Lastly, the discount strategy designed around age group and revenue serves as a fair approach, but it can be further improved by integrating reliable satisfaction data in the future for more personalized and data-driven discount allocation

Hosted Link

https://app.powerbi.com/view?
r=eyJrIjoiNTBiZmMxNzYtMWQ1Ny00NDg1LWFkMzQtZGRjZTc0YTIwOGM2IiwidCI6ImI1
ZjljMDA3LTU3YjEtNDgyOC1iNWVhLTFkMjVhYTdhNzdhMyJ9

THANK YOU