Hospital Management Case Study

By Power BI And MYSQL

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Appointment Analysis

Question:

How many appointments does each doctor have in the last month?

Identify doctors with the highest number of appointments

SQL Query:

How many appointments does each doctor have in the last month?

```
select d.doctor_id , count(a.appointment_id) as Number_of_appointments from appointments as a left join doctors as d using (doctor_id) where a.appointment_date between '2024-08-08' and '2024-09-08' group by d.doctor_id order by Number_of_appointments Desc;
```

Identify doctors with the highest number of appointments.

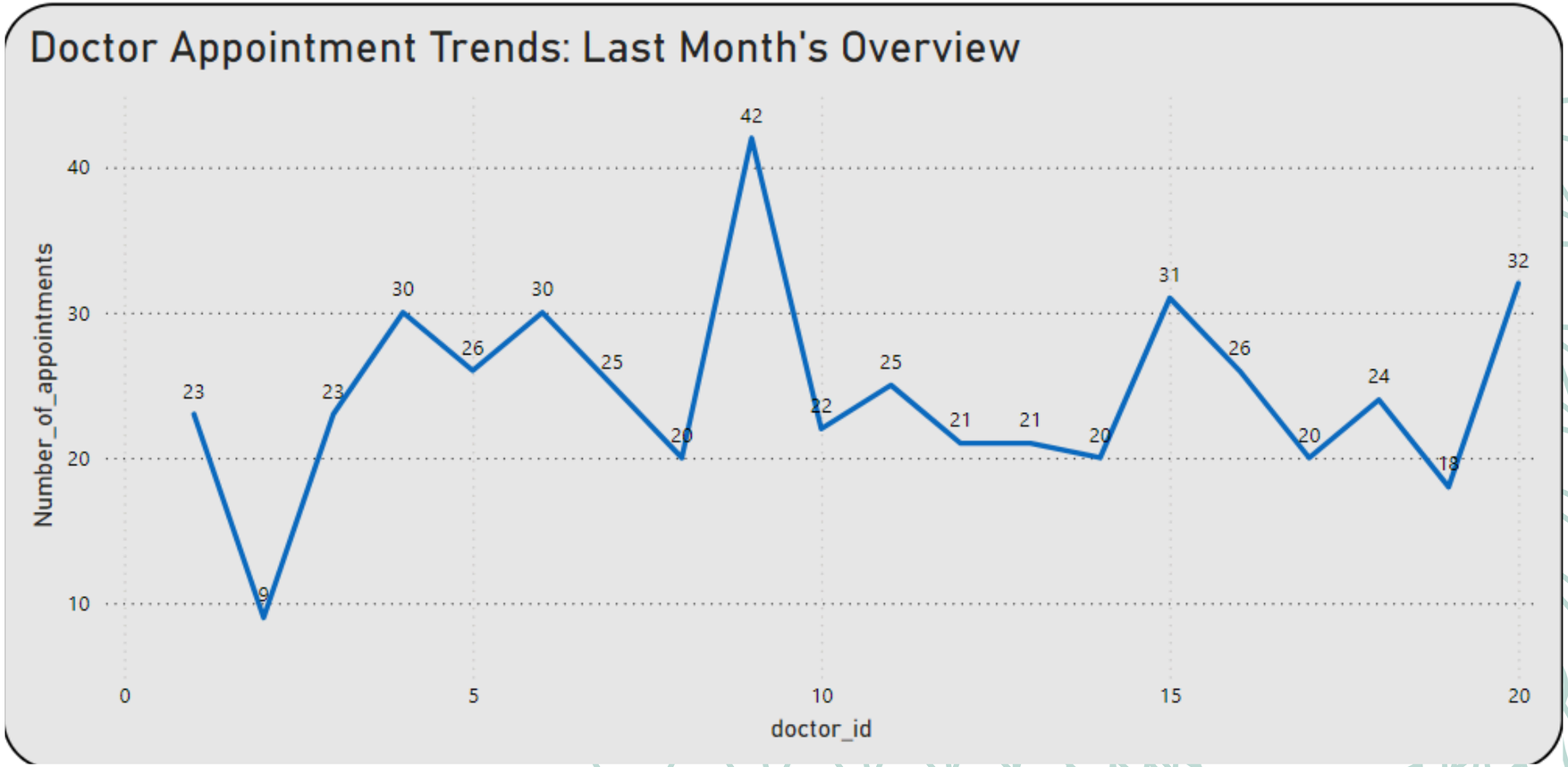
```
select d.doctor_id , d.name AS Doctor_name , count(a.appointment_id) as Number_of_appointments from appointments as a left join doctors as d using (doctor_id) where a.appointment_date between '2024-08-08' and '2024-09-08' group by d.doctor_id , d.name order by Number_of_appointments Desc
```

Visualizations and Insights:

How many appointments does each doctor have in the last month? Identify doctors with the highest number of appointments.

Top Doctors by Appointment Count

Doctor_name	Highest Number_of_appointments
Vihaan Gupta	42



Hypothesis:

Efficient appointment management can enhance patient care by reducing wait times, improving doctor availability, and ensuring better time allocation for each patient.

Key Observations:

- Top Doctor by Appointments: Vihaan Gupta handled the highest number of appointments (42) last month.
- Doctor Appointment Trends: Appointment distribution varies across doctors, with some managing significantly more than others, indicating potential disparities in workload.

Conclusion:

By optimizing appointment scheduling, clinics can ensure a balanced distribution of patients across doctors, preventing overload for some and underutilization for others. This can lead to improved patient satisfaction and better healthcare outcomes.

Recommendation:

To enhance patient care, clinics should adopt efficient appointment management strategies by leveraging intelligent scheduling systems to balance the distribution of patients across doctors. This approach would reduce wait times, prevent doctor overload, and ensure better time allocation for each patient, ultimately leading to improved patient satisfaction and healthcare outcomes. Regular monitoring of appointment trends can help identify and correct workload disparities, fostering a more equitable and efficient healthcare environment.

Patients Analysis

Question:

Which patients have more than three visits in the past year?

Identify patients who haven't visited the hospital in the last year.

SQL Query:

Which patients have more than three visits in the past year?

```
select Patient_id, p.Name , count(a.appointment_id) as Num_of_visits from appointments as A left join patients as P using(patient_id) where a.appointment_date BETWEEN '2023-09-08' AND '2024-09-08' group by patient_id, p.name having count(a.appointment_id) > 3 order by Num_of_visits desc;
```

Identify patients who haven’t visited the hospital in the last year.

```
select patient_id , name from patients where patient_id not in (select distinct patient_id  from appointments as A left join patients as P using(patient_id) where status <> 'Cancelled' and appointment_date BETWEEN '2023-09-08' AND '2024-09-08' ) ;
```

Visualizations and Insights:

Patients with 3+ Visits in the Past Year

Patients Name	Patient_id	Total Numbers of visits
Aditya Kumar	628	13
Krishna Das	189	13
Arjun Mishra	691	12
Ayaan Singh	273	11
Aditya Kumar	440	10
Ayaan Singh	437	10
Krishna Das	687	10
Reyansh Verma	596	10
Sai Reddy	77	10
Vihaan Gupta	25	10
Vivaan Patel	87	10
Vivaan Patel	816	10
Aarav Sharma	745	9
Aarav Sharma	943	9
Aarav Sharma	965	9
Aditya Kumar	749	9
Arjun Mishra	862	9
Ishaan Joshi	515	9
Ishaan Joshi	771	9
Krishna Das	199	9
Krishna Das	439	9

Patients with No Recent Visits (Past Year)

patient_id	Patient Name
321	Aarav Sharma
431	Aarav Sharma
550	Aarav Sharma
670	Aarav Sharma
784	Aarav Sharma
813	Aarav Sharma
359	Aditya Kumar
460	Aditya Kumar
503	Aditya Kumar
518	Aditya Kumar
718	Aditya Kumar
995	Aditya Kumar
491	Arjun Mishra
505	Arjun Mishra
857	Arjun Mishra
117	Ayaan Singh
248	Ayaan Singh
379	Ayaan Singh
707	Ayaan Singh
810	Ayaan Singh
822	Ayaan Singh

Hypothesis:

Analyzing patient visit patterns enables healthcare providers to tailor care programs effectively, prioritizing patients with frequent visits for chronic care management and reaching out to those with no visits for preventive care.

Key Observations:

- High-Visit Patients: Aditya Kumar and Krishna Das have the highest number of hospital visits, indicating they may require ongoing care and monitoring for chronic conditions.
- No-Visit Patients: Aarav Sharma and Aditya Kumar (in certain instances) haven't visited the hospital in the past year, suggesting they may need outreach for preventive care or check-ins.3.5

Conclusion:

By utilizing visit data, healthcare providers can better allocate resources, focusing on high-frequency patients for enhanced care management while also engaging patients who haven’t visited recently to promote preventive health measures, ultimately improving patient outcomes and operational efficiency.

Recommendation:

To optimize patient outcomes and resource allocation, it is recommended that healthcare providers implement a dual-focused strategy based on patient visit patterns. Prioritize high-visit patients, such as Aditya Kumar and Krishna Das, for intensive chronic care management, including personalized follow-ups and monitoring. Simultaneously, proactively engage no-visit patients like Aarav Sharma through targeted outreach initiatives aimed at preventive care, including annual check-ups and screenings. This approach will ensure comprehensive care delivery, improving overall patient health while enhancing operational efficiency.

Treatments Analysis

Question:

What are the most common treatments?

Calculate the average cost of treatments provided.

SQL Query:

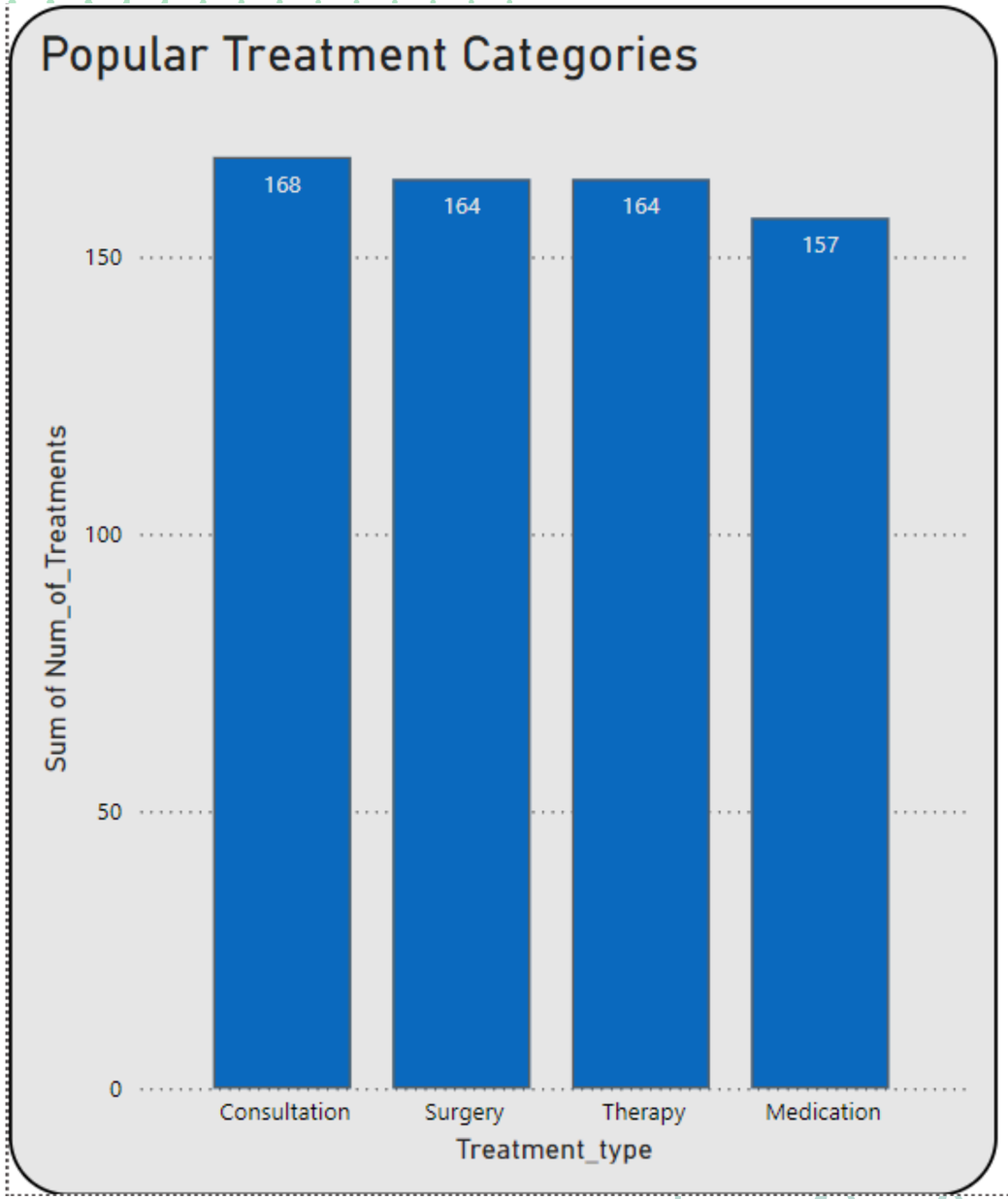
What are the most common treatments?

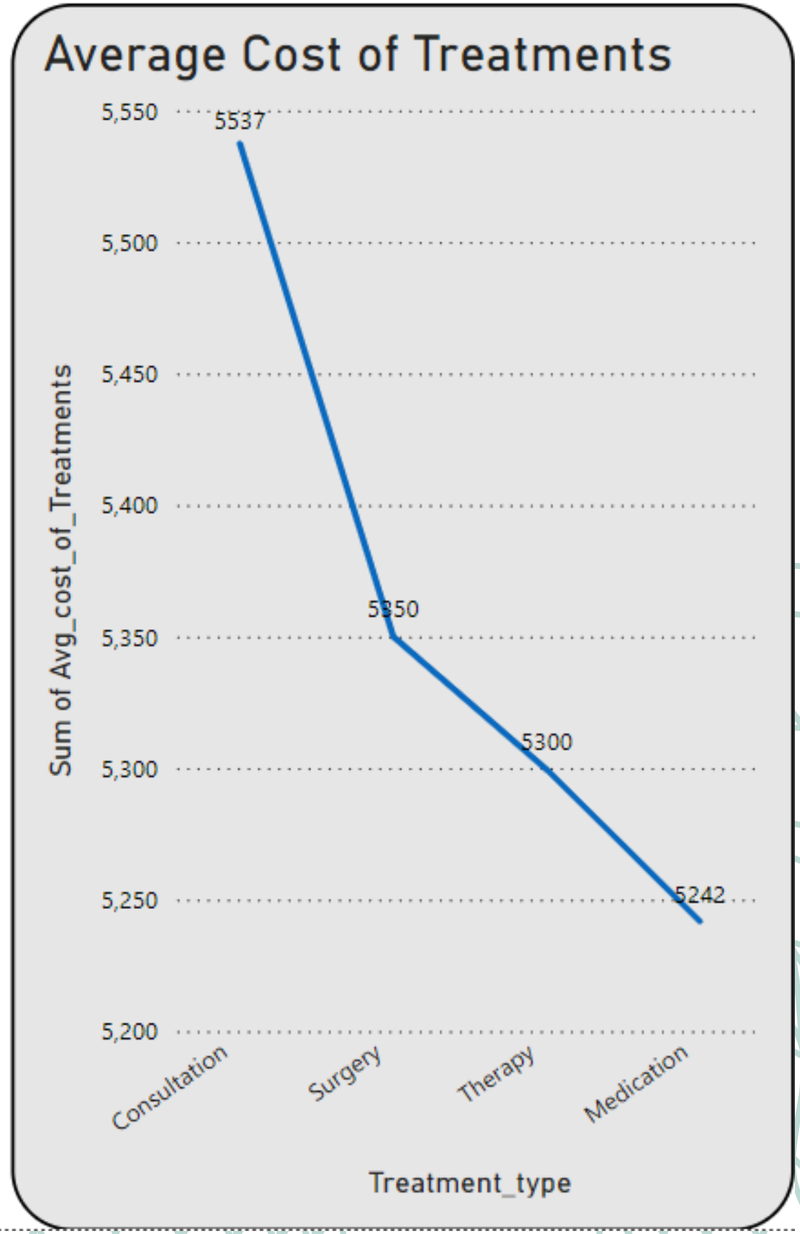
```
select Treatment_type , count(treatment_id) as Num_of_Treatments from
treatments group by treatment_type order by Num_of_Treatments desc;
```

Calculate the average cost of treatments provided.

```
select Treatment_type , round(avg(cost),2) as Avg_cost_of_Treatments from
treatments group by treatment_type order by Avg_cost_of_Treatments desc;
```

Visualizations and Insights:





Hypothesis:

Insights into treatment patterns and costs can help optimize treatment effectiveness, thereby improving patient outcomes.

Key Observations:
Treatment Frequency: Consultation and Surgery are the most frequent treatments, indicating their importance in patient care. Cost Variation: Consultations are the most common but also the most expensive treatment, while medications, being common, have the lowest average cost.

Conclusion:
By analyzing treatment frequency and cost data, healthcare providers can make informed decisions about resource allocation and treatment prioritization. Understanding the balance between the cost of treatments and their effectiveness allows for better patient care, improved outcomes, and cost-efficient healthcare delivery.

Recommendation:

Healthcare providers should utilize insights from treatment frequency and cost data to optimize resource allocation and prioritize treatments effectively. By understanding which treatments are most common and costly, such as consultations and surgeries, and comparing their costs with their effectiveness, providers can identify opportunities for cost savings and improved patient outcomes. Focusing on balancing treatment costs with their impact on patient care will enable more efficient healthcare delivery and enhance overall patient satisfaction.

Doctors Analysis

Question:

Which doctor has the highest treatment success rate?

Calculate the average number of patients seen by each doctor per day.

SQL Query:

Which doctor has the highest treatment success rate?

```
select doctor_id, name as Doctor_name , round(sum(outcome = 'success')/count(doctor_id) * 100 , 2) as Success_rate from treatments as t left join doctors as s  using (doctor_id) group by doctor_id , name order by success_rate desc  ;
```

Calculate the average number of patients seen by each doctor per day.

```
select doctor_id, d.name as Doctor_name, appointment_date ,count(patient_id)  as AVG_num_of_patients from appointments as A left join doctors as d using(Doctor_id) group by doctor_id, appointment_date  , d.name order by AVG_num_of_patients desc;
```

Visualizations and Insights:

Doctor_name	doctor_id	Success_rate
Ayaan Singh	13	65.00
Sai Reddy	11	63.89
Vihaan Gupta	9	61.54
Emily Deleon	1	60.00
Karan Kapoor	17	60.00
Rakesh Kumar	18	55.56
Arjun Mishra	10	54.29
Ishaan Joshi	15	53.49
Aditya Kumar	8	52.78
Rohit Yadav	20	52.63
Holly Vang	4	52.38
Brandon Brown	3	50.00
Ravi Nair	16	48.57
Emma Boyle	5	48.39
Reyansh Verma	12	43.75
Aarav Sharma	6	43.24
Lauren Meza	2	41.67
Vivaan Patel	7	40.00
Pooja Shah	19	38.71
Krishna Das	14	31.25

appointment_date	Doctor_name	doctor_id	AVG_num_of_patients
2024-01-01	Emily Deleon	1	1
2024-01-01	Brandon Brown	3	1
2024-01-01	Aarav Sharma	6	1
2024-01-01	Arjun Mishra	10	1
2024-01-01	Sai Reddy	11	1
2024-01-01	Reyansh Verma	12	1
2024-01-01	Ayaan Singh	13	1
2024-01-01	Rakesh Kumar	18	1
2024-01-01	Vivaan Patel	7	2
2024-01-01	Rohit Yadav	20	2
2024-01-01	Krishna Das	14	3
2024-01-02	Emily Deleon	1	1
2024-01-02	Emma Boyle	5	1
2024-01-02	Aditya Kumar	8	1
2024-01-02	Arjun Mishra	10	1
2024-01-02	Reyansh Verma	12	1
2024-01-02	Krishna Das	14	1
2024-01-02	Ravi Nair	16	1
2024-01-02	Rakesh Kumar	18	1
2024-01-02	Pooja Shah	19	1
2024-01-02	Rohit Yadav	20	1
2024-01-02	Holly Vang	4	2

Hypothesis:

Optimizing resource allocation improves hospital efficiency by ensuring that doctors with higher success rates manage more patients, while balancing workloads across the team.

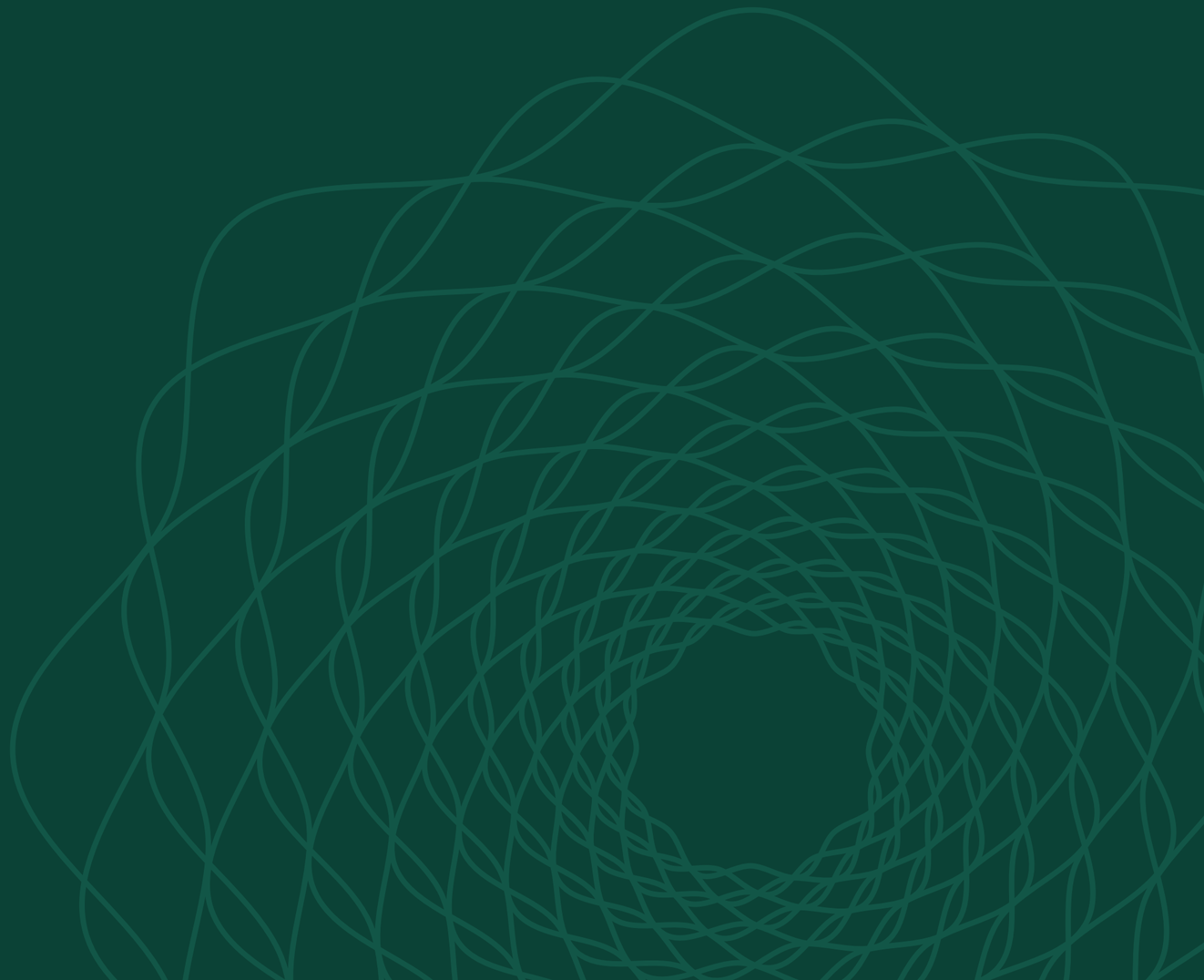
Key Observations:
Highest Success Rate: Ayaan Singh has the highest treatment success rate (65%), followed by Vihaan Gupta (61.54%) and Sai Reddy (63.89%). Average Number of Patients per Day: The table shows most doctors seeing 1-2 patients per day, indicating relatively balanced distribution of patient appointments.

Conclusion:
By assigning more patients to doctors with higher success rates, hospitals can enhance overall care quality. Balancing doctor workloads with efficiency metrics, such as success rates, can improve both patient outcomes and operational effectiveness

Recommendation:

Hospitals should allocate more patients to doctors with higher treatment success rates, like Ayaan Singh, Sai Reddy, and Vihaan Gupta, to enhance care quality and improve patient outcomes. At the same time, maintaining a balanced workload across the team ensures no doctor is overburdened, fostering a sustainable and efficient work environment. By strategically aligning patient assignments with doctors' proven effectiveness, hospitals can achieve both optimal resource utilization and superior operational performance.

Thank You!



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