Project: Healthcare Data Analysis for Hospital Management

Using SQL and PowerBI

Objective: To analyze patient data, hospital resources, and treatment outcomes to improve operational efficiency and patient care.

Dataset Description:

Patients: PatientID, PatientName, Gender, Age, Address, ContactNumber

Admissions: AdmissionID, PatientID, AdmissionDate, DischargeDate, Department, DoctorID, Diagnosis

Treatments: TreatmentID, AdmissionID, TreatmentDate, TreatmentType, TreatmentCost

Doctors: DoctorID, DoctorName, Specialization, ContactNumber

Departments: DepartmentID, DepartmentName

Data Analysis Tools

SQL : For data extraction, transformation, and loading (ETL).

Power BI : For data visualization and reporting.

SQL QUERIES :

```
9     # Q1). Total Admissions by Month
10 •  select year(AdmissionDate) as Year, month(AdmissionDate) as month, count(*) as totaladmissions
11    from admissions group by year(AdmissionDate), month(AdmissionDate)
12    order by year, month;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Year	month	totaladmissions
2022	7	21
2022	8	112
2022	9	117
2022	10	129
2022	11	120
2022	12	117
2023	1	146
2023	2	111
2023	3	130

```sql
14      # Q2). Average Length of Stay by Department
15 •    select department, round(avg(datediff(AdmissionDate, DischargeDate)),2) as AvgLenofStay
16      from admissions
17      group by department
18      order by AvgLenofStay desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

department	AvgLenofStay
Occupational therapist	-165.18
Catering manager	-171.15
Scientist, research (life sciences)	-177.05
Surveyor, hydrographic	-183.39
Firefighter	-184.35
Retail buyer	-184.89
Lighting technician, broadcasting/film/video	-188.41
Warehouse manager	-189.07
Fast food restaurant manager	-191.63

```sql
# Q3). Total Treatment Cost by Department
select a.department, round(sum(t.treatmentcost),2) as total_treatment_cost
from treatments as t
join admissions as a on t.admissionid = a.admissionid
group by a.department
order by total_treatment_cost desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

department	total_treatment_cost
Firefighter	3054235.2
Warehouse manager	1600177.83
Retail buyer	1559524.23
Lighting technician, broadcasting/film/video	1556626.67
Scientist, research (life sciences)	1480770.8
Fast food restaurant manager	1468890.28
Catering manager	1443315.82
Surveyor, hydrographic	1437104.82
Occupational therapist	1428964.19

```sql
# Q4). Top 5 Doctors by Number of Admissions
select d.doctorname, count(a.admissionid) as number_of_admissions
from admissions as a
join doctors as d on a.doctorid = d.doctorid
group by d.doctorname
order by number_of_admissions desc limit 5;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

doctorname	number_of_admissions
Marcus Doyle	80
Robert Williams	77
Jason Gonzalez	73
Zachary Oliver	70
Elizabeth Wilson	69

```sql
# Q5). Total Treatment Cost by Doctor
select d.doctorname, round(sum(t.treatmentcost),2) as total_treatment_cost
from treatments as t
join admissions as a on a.admissionid = t.admissionid
join doctors as d on a.doctorid = d.doctorid
group by d.doctorname
order by total_treatment_cost desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

doctorname	total_treatment_cost
Robert Williams	422748.05
Jason Gonzalez	388093.51
Elizabeth Wilson	363132.69
Jeremy Juarez	362205.75
Paul Burns	361924.58
Zachary Oliver	361452.58
Gail Chavez	352990.99
Belinda Brown	351802.59
Marcus Doyle	347565.2
Jimmy Brown	346746.42
Scott Pearson	340035.45

```sql
# Q6). Number of Admissions by Age Group
SELECT
    CASE
        WHEN Age < 18 THEN 'Under 18'
        WHEN Age BETWEEN 18 AND 29 THEN '18-29'
        WHEN Age BETWEEN 30 AND 39 THEN '30-39'
        WHEN Age BETWEEN 40 AND 49 THEN '40-49'
        WHEN Age BETWEEN 50 AND 59 THEN '50-59'
        ELSE '60+'
        end as agegroup,
        count(*) as number_of_admissions
from patients as p
join admissions as a on p.patientid = a.patientid
group by agegroup
order by number_of_admissions desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

agegroup	number_of_admissions
60+	1257
Under 18	532
18-29	374
30-39	306
50-59	288
40-49	243

```sql
58      # Q7). Total Number of Patients by Department
59 •    select department, count(distinct patientid) as total_no_of_patients
60      from admissions
61      group by department
62      order by total_no_of_patients desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

department	total_no_of_patients
Firefighter	444
Retail buyer	276
Warehouse manager	270
Lighting technician, broadcasting/film/video	269
Fast food restaurant manager	265
Scientist, research (life sciences)	265
Surveyor, hydrographic	254
Occupational therapist	252
Catering manager	237

```sql
# Q8). Monthly Admissions Growth Rate
select year(admissiondate) as year,
month(admissiondate) as month,
count(*) as totaladmissions,
LAG(COUNT(*), 1) OVER (ORDER BY YEAR(AdmissionDate), MONTH(AdmissionDate)) AS PreviousMonthAdmissions,
(COUNT(*) - LAG(COUNT(*), 1) OVER (ORDER BY YEAR(AdmissionDate), MONTH(AdmissionDate))) /
LAG(COUNT(*), 1) OVER (ORDER BY YEAR(AdmissionDate), MONTH(AdmissionDate)) * 100 AS GrowthRate
from admissions
group by year(admissiondate), month(admissiondate)
order by year, month;

```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

year	month	totaladmissions	PreviousMonthAdmissions	GrowthRate
2022	7	21	NULL	NULL
2022	8	112	21	433.3333
2022	9	117	112	4.4643
2022	10	129	117	10.2564
2022	11	120	129	-6.9767
2022	12	117	120	-2.5000
2023	1	146	117	24.7863
2023	2	111	146	-23.9726
2023	3	130	111	17.1171
2023	4	128	130	-1.5385
2023	5	130	128	1.5625
2023	6	110	130	-15.3846

```sql
# Q9). Average Age of Patients by Department
select a.department, avg(p.age) as average_age
from admissions as a
join patients as p on a.patientid = p.patientid
group by a.department
order by average_age;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

department	average_age
Lighting technician, broadcasting/film/video	45.7710
Warehouse manager	46.3962
Catering manager	48.6989
Retail buyer	48.8716
Scientist, research (life sciences)	49.3742
Firefighter	49.6944
Fast food restaurant manager	51.5980
Surveyor, hydrographic	52.5769
Occupational therapist	53.6586

```sql
# Q10). Number of Treatments by Type
select treatmenttype, count(*) as number_of_treatments
from treatments
group by treatmenttype
order by number_of_treatments desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

treatmenttype	number_of_treatments
Therapy	1539
Surgery	1513
Consultation	1484
Medication	1464

```sql
# Q11). Total Treatment Cost by Month
select year(treatmentdate) as year, month(treatmentdate) as month, sum(treatmentcost) as total_treatment_cost
from treatments
group by year(treatmentdate), month(treatmentdate)
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

year	month	total_treatment_cost
2024	3	683525.4100000004
2023	3	677059.34
2023	5	671958.34
2022	11	667504.6899999998
2023	7	659098.11
2023	12	656992.9100000001
2023	11	653378.3399999996
2024	6	650343.0400000002
2023	4	650073.3599999999
2022	10	646138.1800000004
2024	1	642111.7300000003
2022	12	636383.2999999999

```sql
# Q12). Total Number of Patients by Gender
select gender, count(*) as total_number_of_patients
from patients
group by gender
order by total_number_of_patients desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

gender	total_number_of_patients
Male	505
Female	495

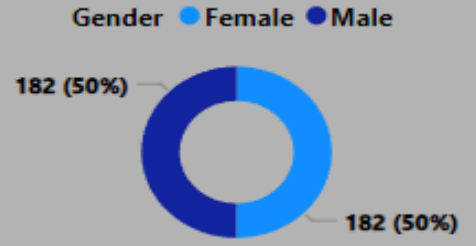
Healthcare Data Analysis for Hospital Management

Total Patients	Total Doctors	Total Admissions
501K	1275	5M

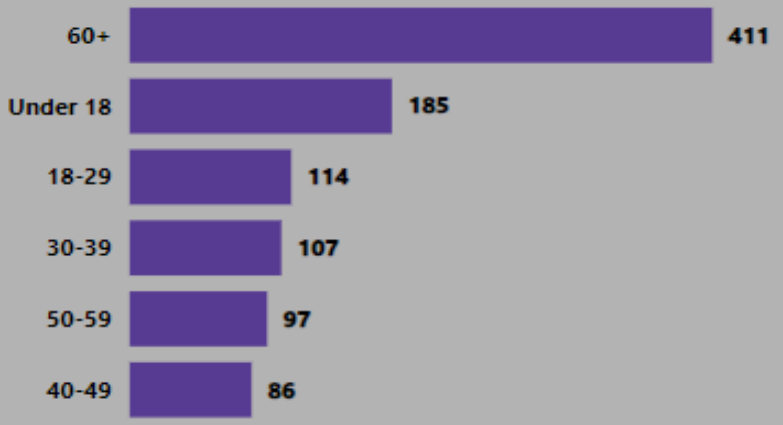
Department: All

AgeGroup: All

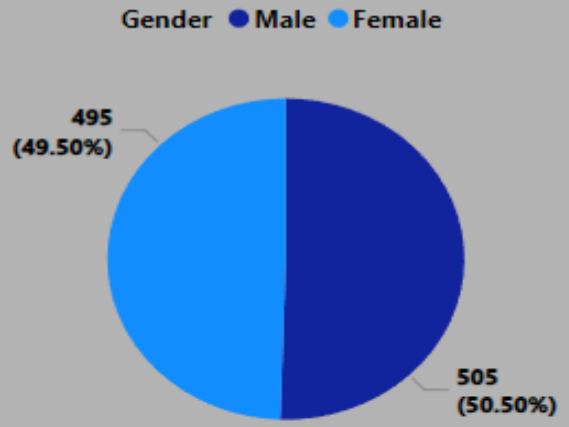
Stay by Gender



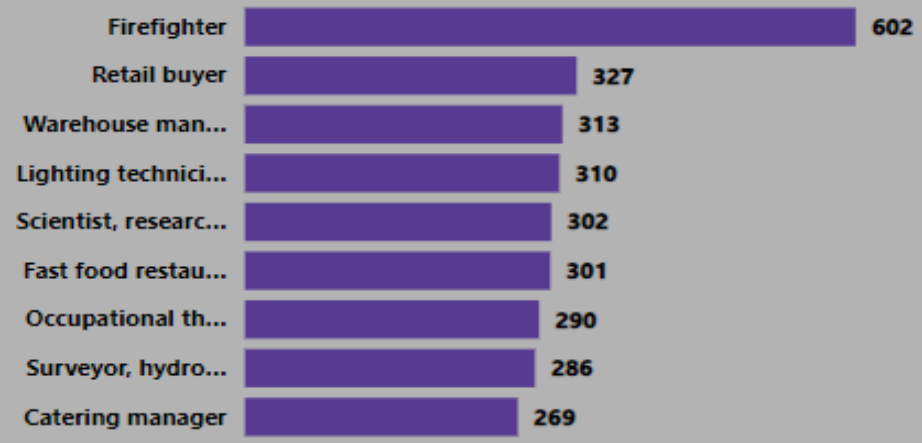
Patients wise Age_Group



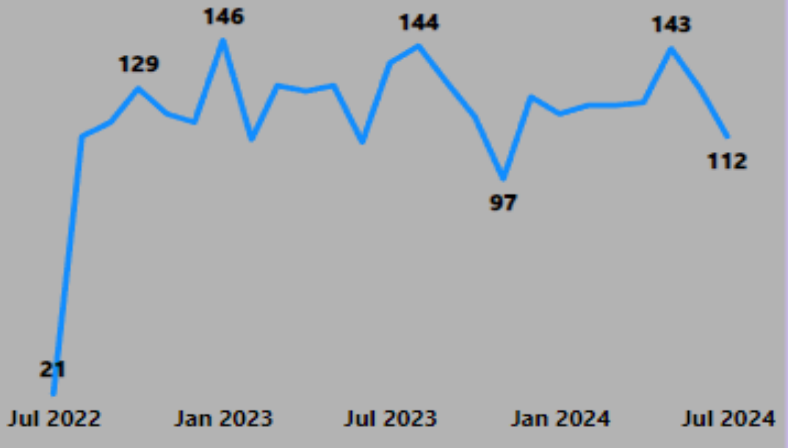
Patients wise Gender



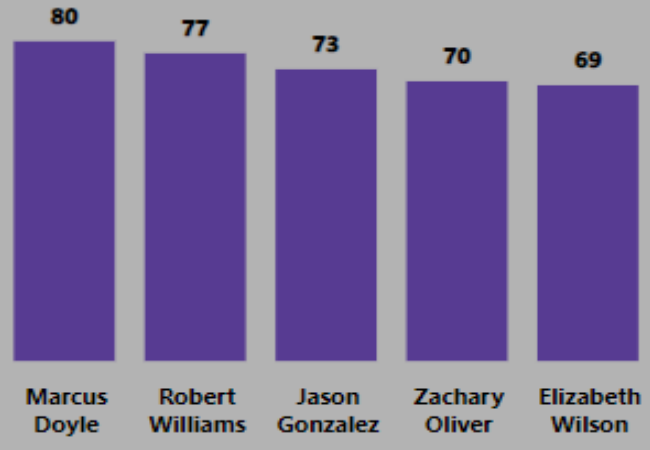
Department wise Admission



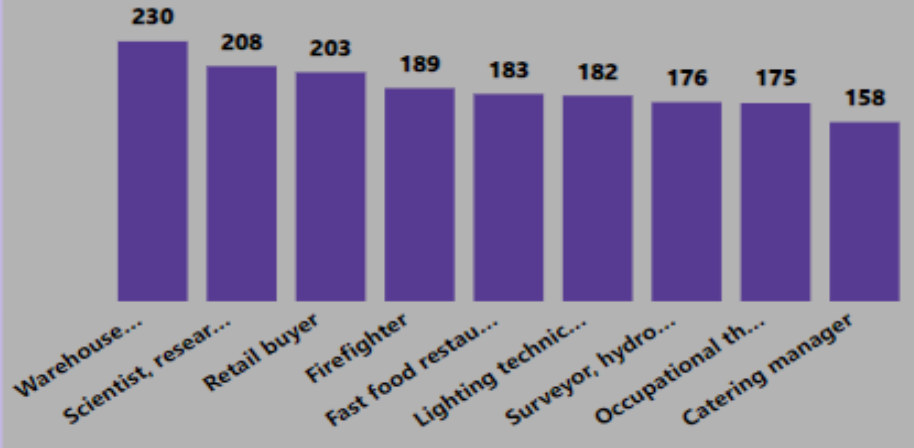
Count of Admissions



Top 5 Doctors by Number of Admissions



Average Length of Stay by Department



Recommendations

1. Optimize resource allocation based on demand.
2. Improve patient care protocols to reduce costs and stay lengths.
3. Enhance training for doctors with lower success rates.
4. Expand outreach programs to underserved areas.
5. Continuously monitor and adjust strategies for efficiency and care quality.`

Thank
You