ED VISIT ANALYSIS

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Contents

Basic Analytics

Q1: What is the average number of MH visits per day to Hospital A?

QUERY

```
WITH MH_VISITS_DAILY AS
(
    SELECT CAST([ArrivalDateTime] AS DATE) AS VISIT_DATE, COUNT(*) AS VISIT_FREQ
    FROM [NEDA].[dbo].[HOSPITAL_A]
    GROUP BY CAST([ArrivalDateTime] AS DATE)
)
SELECT ROUND(AVG(CAST(VISIT_FREQ AS FLOAT)),2) AS AVG_DAILY_VISIT
FROM MH_VISITS_DAILY;
```

RESULT

AVG_DAILY_VISIT = 1.61

Q2: How many unique patients arrived at Hospital A in total, and by each acuity level?

QUERY

```
SELECT [AcuityLevel], COUNT(DISTINCT [PatientID]) AS UNIQUE_PATIENT
 FROM [NEDA].[dbo].[HOSPITAL_A]
 GROUP BY [AcuityLevel]
ORDER BY COUNT(DISTINCT [PatientID]) DESC
```

RESULT

AcuityLevel	UNIQUE_PATIENT
3	91
4	42
2	35
5	4
1	3

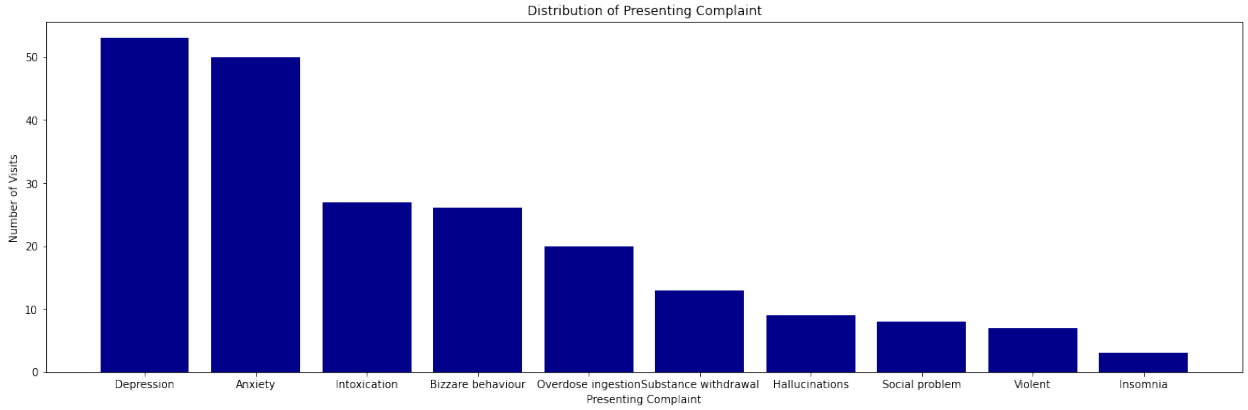
Q3: List top three most common presenting complaints in Hospital A, and their respective number of visits.

QUERY

```
SELECT top (3)[PresentingComplaint], COUNT(*) AS FREQ
 FROM [NEDA].[dbo].[HOSPITAL_A]
 GROUP BY [PresentingComplaint]
ORDER BY COUNT(*) DESC
```

RESULT

PresentingComplaint	FREQ
Depression	53
Anxiety	50
Intoxication	27



Q4: Length of Stay in Emergency Department (from arrival time to time leaving ED)

a. What is the average length of stay in Emergency Department of Hospital A patients, in hours and minutes?
b. What is the median length of stay of these patients, in hours and minutes?
c. How would you explain the difference between the median length of stay and the average length of stay?
d. What is the range of variability of the length of stay?

QUERY

```
WITH STAY_LEN AS
```

```
(
    SELECT CAST(DATEDIFF(MINUTE, [ArrivalDateTime], [DateTimeLeftEmergency]) AS FLOAT) AS
STAY_LEN_MM,
ROUND(CAST(DATEDIFF(MINUTE, [ArrivalDateTime], [DateTimeLeftEmergency]) AS FLOAT) / 60,
2) AS STAY_LEN_HH
    FROM  [NEDA].[dbo].[HOSPITAL_A]
)

SELECT  ROUND(CAST(AVG(STAY_LEN_MM) / 60 AS FLOAT),2) AS STAY_HH_AVG,
        ROUND(CAST(AVG(STAY_LEN_MM) AS FLOAT),2) AS STAY_MM_AVG,
             ROUND((MAX(STAY_LEN_MM) - MIN(STAY_LEN_MM))/60,2) AS RANGE_STAY_LEN_HH
FROM
    STAY_LEN;
```

RESULT

STAY_HH_AVG	STAY_MM_AVG	RANGE_STAY_LEN_HH
4.66	279.81	26.82

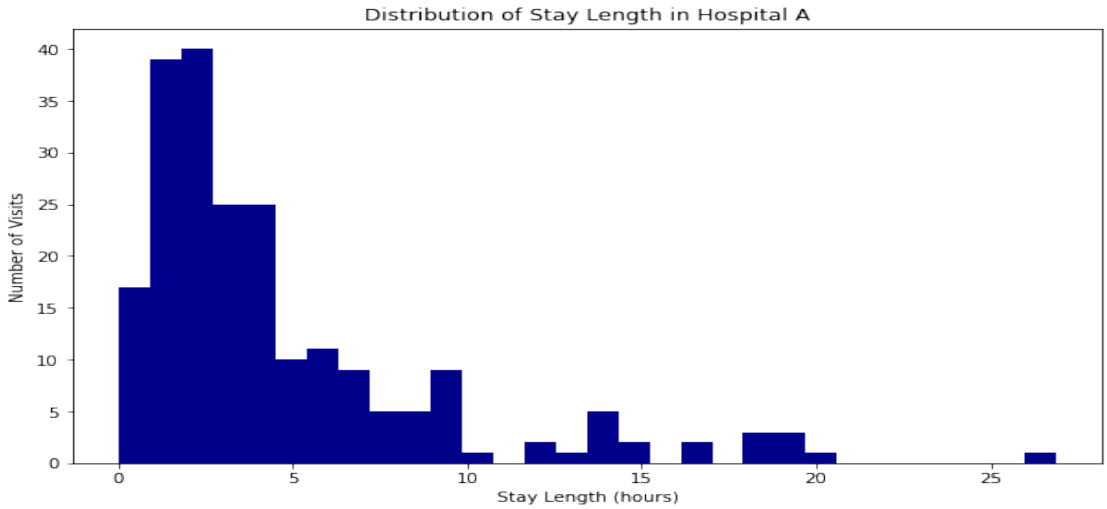
MEDIAN QUERY

```
WITH STAY_LEN AS
(
    SELECT CAST(DATEDIFF(MINUTE, [ArrivalDateTime], [DateTimeLeftEmergency]) AS FLOAT) AS
STAY_LEN_MM
    FROM  [NEDA].[dbo].[HOSPITAL_A]
)
SELECT MAX(STAY_LEN_MM / 60) AS MEDIAN
FROM
(
SELECT STAY_LEN_MM,
 NTILE (4) OVER (ORDER BY STAY_LEN_MM) AS QUARTILE
 FROM STAY_LEN
 ) A
 WHERE QUARTILE = 2
```

RESULT

MEDIAN
2.9

The median is 2.9 while the mean of stay is 4.66, which shows that some patients stayed for a long time which affected the mean. The fact that the mean (4.66) is significantly higher than the median (2.9) suggests that the distribution of stay lengths is right-skewed. This means that while most patients had relatively short stays, there are some patients with much longer stays, which is pulling the mean up.



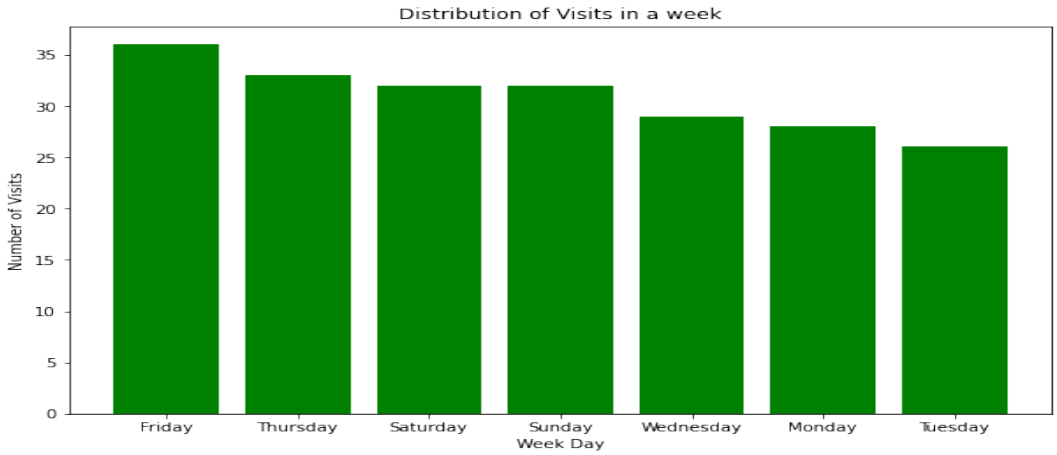
Q5: Patient volume by day of the week

QUERY

```
SELECT DATENAME(WEEKDAY, [ArrivalDateTime]) AS WEEKDAY, COUNT(*) AS FREQ
FROM [NEDA].[dbo].[HOSPITAL_A]
GROUP BY DATENAME(WEEKDAY, [ArrivalDateTime])
ORDER BY COUNT(*) DESC
```

RESULT

WEEKDAY	FREQ
Friday	36
Thursday	33
Saturday	32
Sunday	32
Wednesday	29
Monday	28
Tuesday	26



a. What might your answer from 5a tell you?

The data shows that hospital visits are most frequent towards the end of the week and on weekends, with Friday, Thursday, Saturday, and Sunday having the highest numbers. This pattern suggests that patients may be more tending to visit the hospital later in the week, possibly because they have more free time during the weekend.

Hospitals should consider staffing adjustments and facility preparation to accommodate this increase in visits during these days. However, since this data only covers visits from September 2021 to March 2022, analyzing a longer time period would provide a better foundation for policy-making and resource planning.

Q6: How many unique Hospital A patients went to Hospital B after their initial Hospital A visits within 24 hours?

QUERY

```
WITH INITIAL_VISIT AS (
    SELECT [PatientID], MIN([ArrivalDateTime]) AS FIRST_VISIT_TIME
    FROM [NEDA].[dbo].[HOSPITAL_A]
    GROUP BY [PatientID]
),
HB_VISIT AS (
    SELECT DISTINCT A.[PatientID]
    FROM INITIAL_VISIT A
    JOIN [NEDA].[dbo].[HOSPITAL_B] B
      ON A.[PatientID] = B.[PatientID]
     AND B.[ArrivalDateTime] BETWEEN A.FIRST_VISIT_TIME AND DATEADD(HOUR, 24,
A.FIRST_VISIT_TIME)
)
SELECT COUNT (DISTINCT [PatientID]) AS UNI_PATIENT
FROM HB_VISIT;
```

RESULT

UNI_PATIENT
14

First, I determined the earliest visit time for each patient at Hospital A by using the MIN function and grouping by PatientID, ensuring that I captured each patient's first visit. Next, I matched these patients to their records in Hospital B, focusing on visits that occurred within 24 hours of their initial visit to Hospital A. then in JOIN step, I used a condition, where the ArrivalDateTime in Hospital B fell between the first visit time at Hospital A and 24 hours later. Lastly, I used the DISTINCT function to count the unique patients who met these criteria, ensuring each patient was counted only once, even if they had multiple visits within that 24-hour period.

Q7: Hospital A+B

QUERY

```
SELECT *
INTO HOSPITAL_AB
FROM [NEDA].[dbo].[HOSPITAL_A]
UNION ALL
SELECT * FROM [NEDA].[dbo].[HOSPITAL_B]

SELECT COUNT(DISTINCT([PatientID]))
FROM HOSPITAL_AB
WHERE DATEPART(HOUR, [ArrivalDateTime]) BETWEEN 8 AND 16
```

RESULT

UNI_PATIENT
653

QUERY

```
SELECT *
FROM HOSPITAL_AB
WHERE (CAST([ArrivalDateTime] AS DATE) BETWEEN '2021-09-01' AND '2021-10-15')
    OR
    (CAST([ArrivalDateTime] AS DATE) BETWEEN '2022-02-01' AND '2022-03-31');
```

RESULT

A table with 934 rows

- How would you show only the data for “Hospital A”?

VisitID in Hospital A starts with letter F, and in Hospital B starts with letter C, so:

```
SELECT * FROM [NEDA].[dbo].[HOSPITAL_AB] WHERE [VisitID] LIKE 'F%';
```

- If you had another table, [Doctor on Duty], that shares the same “VisitID” values as in [Hospital A + B], and provides additional information such as “DoctorName”, explain how you would join these two tables to obtain the # of patients seen by each doctor.

In this case, I would use VisitID to join these 2 tables, and use COUNT(DISTINCT) to know the number of unique patients seen by each doctor, using GROUP BY DoctorName.

SELECT DoctorName, COUNT(DISITINCT([PatientID])) AS uni_PATIENT_FREQ

FROM JOINED_TABLE

```
GROUP BY DoctorName
```

If I wanted just to know the number of visited patients by each doctor, not unique patients, I would not use the DISTINCT function.

```
SELECT DoctorName, COUNT(*) AS PATIENT_FREQ
FROM JOINED_TABLE
GROUP BY DoctorName
```

Analysis Recommendations

1. Based on your analysis above, what recommendations could you provide to the manager to address her concerns?

Based on the analysis, the acuity level 1 cases, which require immediate attention, were relatively rare, occurring only 3 times over the six months from September 2021 to April 2022 in Hospital A. However, acuity levels 2 and 3 made up more than 70% of the cases, indicating that these patients do require treatments. By checking community MH data, it seems that 7.4% of all patients in Hospital A and 3% from Hospital B, were assigned to these communities outside hospitals at the time of the emergency, which prove her concern that many of these patients may not need to visit the hospital at all, and should visit such an MH centers in these cases.

Given the limited resources at Hospital A, it would be practical for the hospital director to advocate for additional specialized staff and facilities. In the short term, increasing staffing levels on the busier days—Fridays, Thursdays, Saturdays, and Sundays—could be an effective way to manage the higher patient volumes.

The other recommendation can be implementing telehealth or community mental health screenings to identify patients who needs hospital visits.

2. Can you make any recommendations regarding the practice of sending patients to another hospital?

In terms of referring patients to other hospitals, as I saw, the number of patients in Hospital B was 8 times more than in Hospital B, and while I do not have any supplementary data on the number of staff and capacities in Hospital B, I can not recommend to referring patients to Hospital B. I think she has to ask for some meetings with health authorities of the region, mentioning the problem and ask for the same analysis from other hospitals to see their capacities for handling this situation. Also, analyzing data on community clinics and offices and data on patients' satisfaction with these clinics.

Similar to the above recommendation, it can be practical to enhance pre-screening procedures that involve telehealth consultancies with mental health professionals to reduce unnecessary visits at hospitals and waiting times.

3. Are there any other questions not asked in the Basic Analytics section that you think the manager might be interested in, based on her stated concerns?

For some of these questions, I need supplementary data.

- Some more analysis of Hospital B data to know the situation in that hospital too
- What are the Peak Times for MH Patient Arrivals?
- Referring time for each patient who was referred to Hospital B and community clinics and offices.
- Is There a Seasonal Pattern in MH Patient Visits?
- Investigating patient data by their demographics.
- Data on the number of staff and their average daily workloads
- How satisfied are patients with the care they receive?
- Rate of patient returns at hospitals and community clinics and offices.