**Visualization of Dataset using Power BI**

**Gender**

A blue bar graph with white text

Description automatically generatedThe bar chart below shows that 41.06 % of females suffered from diabetes, while about 36.5% of male patients are reported to have this disease. It is also can be seen that the number of women who went to the hospital is about 10 per cent higher than men.

Figure 3:Gender distribution regarding Diabetes medication

**Race**

Chart

Description automatically generatedThis feature is divided into four different categories: Caucasian, African American, Hispanic and Asian. Among these groups, Caucasians have by far the highest rate of diabetes with 62.61%, and Asian were the lowest number below 1 per cent of diabetes patients.

Figure 4:Race distribution regarding Diabetes medication

**Age**

As it is seen, there are 10 different age groups ranging from 10 to 100. The highest number of diabetic encounters belongs to the 70-80 age group with 5.61 % of diabetes followed by the age group 60-70 with 4.64%, whereas children below 10 years are less likely to have diabetes, as below 1 per cent of them take diabetes medication. Furthermore, while the chance of getting diabetes is higher when people grow older, because of the upward trend in the graph, after 80 years the number of people who takes the medication has lowered.

A graph of blue bars

Description automatically generated

Figure 5: Age distribution regarding Diabetes medication

**Admission Type**

This variable is also categorical containing eight different groups: Emergency, Urgent, Elective, New-born, trauma canter, not available, null, and Not mapped. More than half of the encounters fall into the Emergency category. Urgent and Elective ranked second and third higher numbers as shown in this figure.

A pie chart with different colored circles

Description automatically generated

Figure 6: Distribution of Admission type

A screenshot of a computer

Description automatically generatedThis bar chart illustrates the number of people taking diabetes medication in different admission-type groups. Those who received these medications mostly encountered as Emergency with over 40% of diabetes encounters. Which means the hospitals would expect more diabetes emergency cases. This is also the case for other group admission types like Urgent with 15.10% of the Elective with 14.04 of diabetes being admitted to US Hospitals.

Figure 7: Admission type regarding Diabetes medication

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## **The efficiency of the hospital care**

In the chart below, we aim to explore the relationship between the number of days people stay in the hospital and the rate of readmission. As the figure depicted, the more time people stay in the hospital the less readmission they will have. However, there is an exception. Those who must spend 3 and 2 days in the hospital are more likely to visit the hospital again.

A graph of blue and white bars

Description automatically generated

Figure 8: Readmission regarding Time in hospital

## **The readmission Variable and its relationship with other variables**

As we explored in the previous part most diabetes patients are females between 70 to 80 years old. Now knowing the target population, this bar chart can help to find out which group of people mostly readmitted of how many of those patients readmitted we c it can help to find out how many of those patients are readmitted, therefore the quality of healthcare services can be evaluated.

This bar chart shows what percentage of the patients who take diabetes medication were readmitted. More than 30 per cent of diabetes patients and about 10% of non-diabetes patients are readmitted again. This indicates that hospital care was more effective in providing health care for nondebates encounters.

A screenshot of a graph

Description automatically generated

Figure 10: Diabetes medication regarding Readmission

In the next part, we look at the relationship between the readmitted column with other features.

**Gender**

Figure 11:Gender distribution regarding Readmission

Considering the re admission feature and gender, this figure shows 26% of females and 22% of males were readmitted. This confirms that more women than means came back to the hospital in the next few days.

A graph of different colored bars

Description automatically generated

**Age**

The result of this bar chart also confirmed that people between 70 to 80 years old are the main group that readmitted again. The trend is like the Age and diabetes medication Bar chart.

A graph of different colored bars

Description automatically generated

Figure 12: Age distribution regarding Readmission

**Race**

The chart in which the number of encounters of different races is visualized concerning readmission similarly shows that Caucasians have the highest rate of readmission among others. It also illustrated that there is an insignificant difference between readmitted and non-readmitted people regarding their races.

Chart, bar chart, waterfall chart

Description automatically generated

Figure 13:Race distribution regarding Readmission

**Admission Type**

Considering the relationship between Admission type and readmitted, it emphasizes that 23.49% of readmitted patients are in the Emergency section which is the highest among others while the highest number of non-readmitted belong to this category, it is worth mentioning that the difference between these two categories is also more than 15% which is considerable. Another point to consider is that the number of those who did not return to the hospital is higher in all the admission types.

A screenshot of a computer

Description automatically generated

Figure 14: Admission type and Readmission

**Num\_medications**

The number of medications is referring to the number of distinct generic names administered during the encounter. The line graph gives information about the number of medications and readmission. As seen below, when the number of medications is between 10 to 16 the readmission percentage has the highest value. What is more, after 16 the readmission rate decreased for both Readmitted and NotReadmitted categories.

A graph with green lines and numbers

Description automatically generated

Figure 17: Number of medications regarding Readmission

**Diag\_1**

A picture containing chart

Description automatically generatedThis feature shows the primary diagnosis coded as the first three digits of ICD9 and contains 848 distinct values. To explore the readmission rate of diabetes patients the ICD9 code for the diabetic disease is extracted including values from 250.0 to 250.9 and 250.x0, 250.x2, 250.x3, 250.x4.

Figure 18: Diagnosis-1 regarding Readmission

**Admission\_source\_id**

This column is categorized into 21 distinct values showing the source of admission, for example, physician referral, emergency room, and transfer from a hospital.

As shown in the graph below, the emergency patient has the most readmission rate among others following Physician referral.

Chart, waterfall chart

Description automatically generated

Figure 20: Admission source id and Readmission