Diabetes Prediction Model

TEAM: Data_wizards

Anthony Ngatia

Naomi Rotich

Elsie Nduta

Mitchele Okubasu

Content Outline

Topics for discussion

Project Overview

- Dataset: Extensive medical records of patients, including demographics, clinical measurements, and medical history.
- Methodology: CRISP-DM framework - Business Understanding, Data Understanding, Data Preparation, Modeling, Evaluation and Deployment.
- Tools: Google Colab, Jupyter Notebook, Github, Spyder(Anaconda)etc.

Project Roadmap

CRISP-DM Process

Business Understanding

Data Understanding

Data Preparation

Modelling & Evaluation

Deployment Analysis

Exploratory Data Analysis

Introduction

- **Objective:**

To develop an accurate and reliable predictive model for early detection of diabetes.

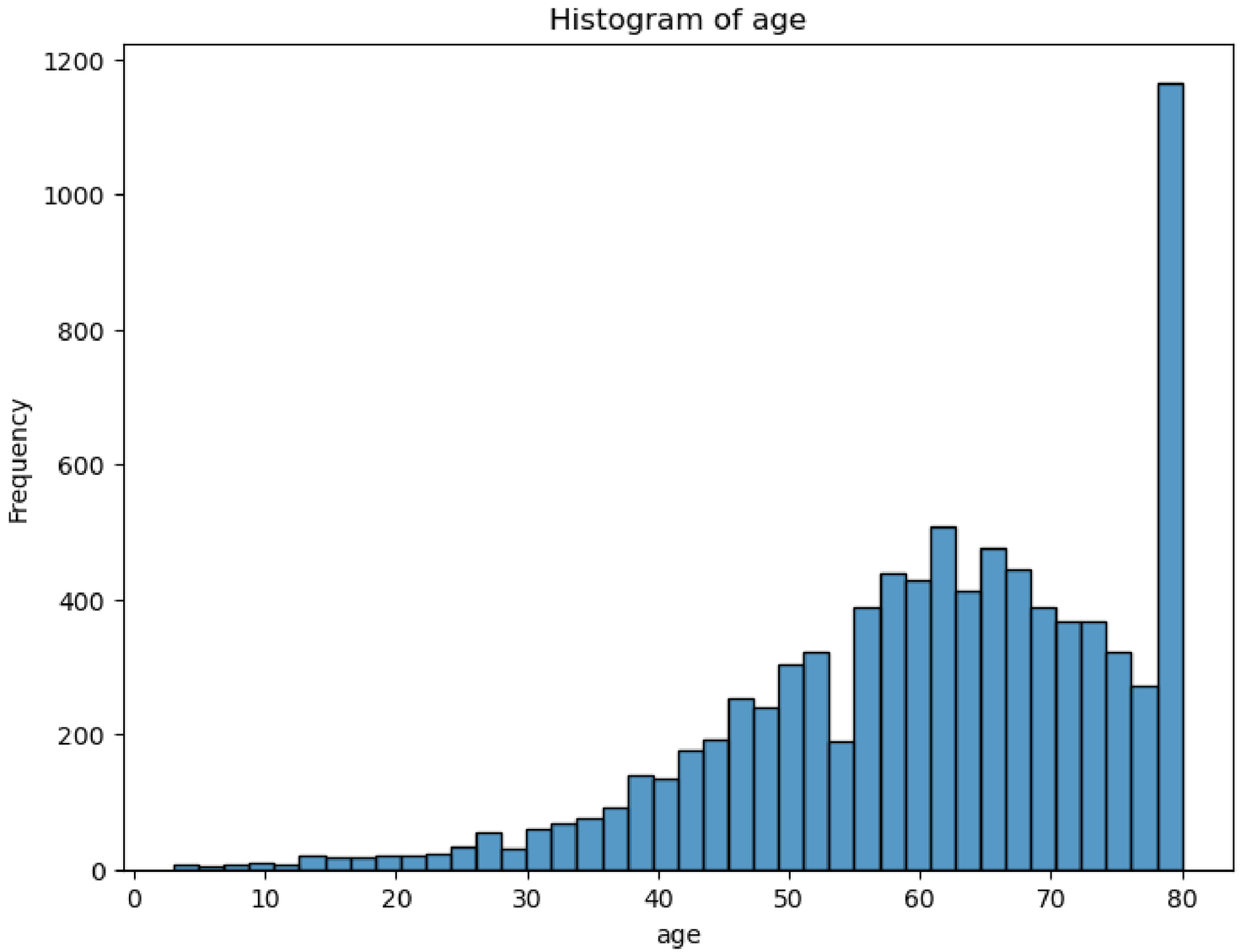
- **Why it matters:**

Early detection can lead to timely intervention and better patient outcomes.

- **Data-driven approach:**

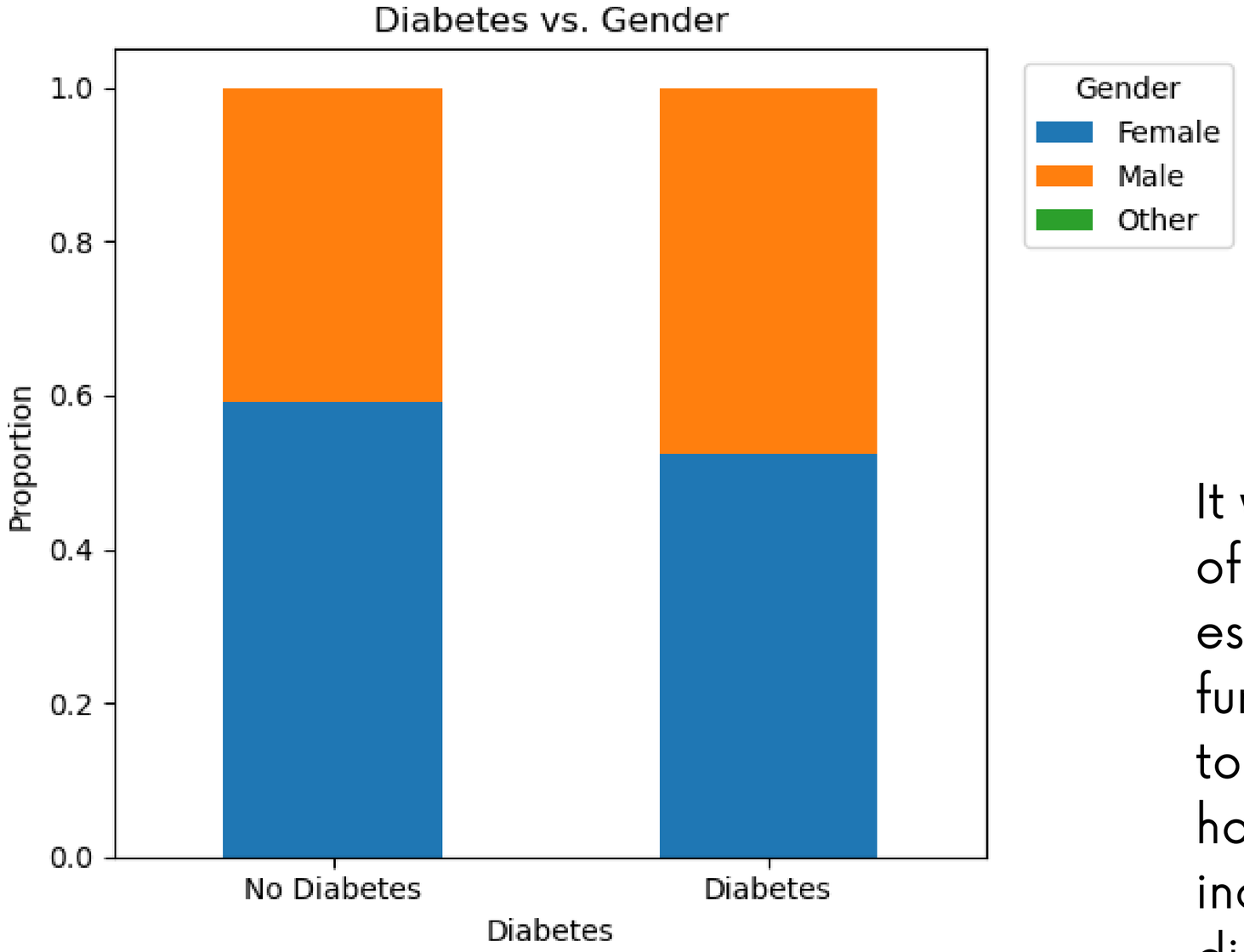
Utilizing advanced data analysis and machine learning techniques.

From what age does Diabetes occurence increase?



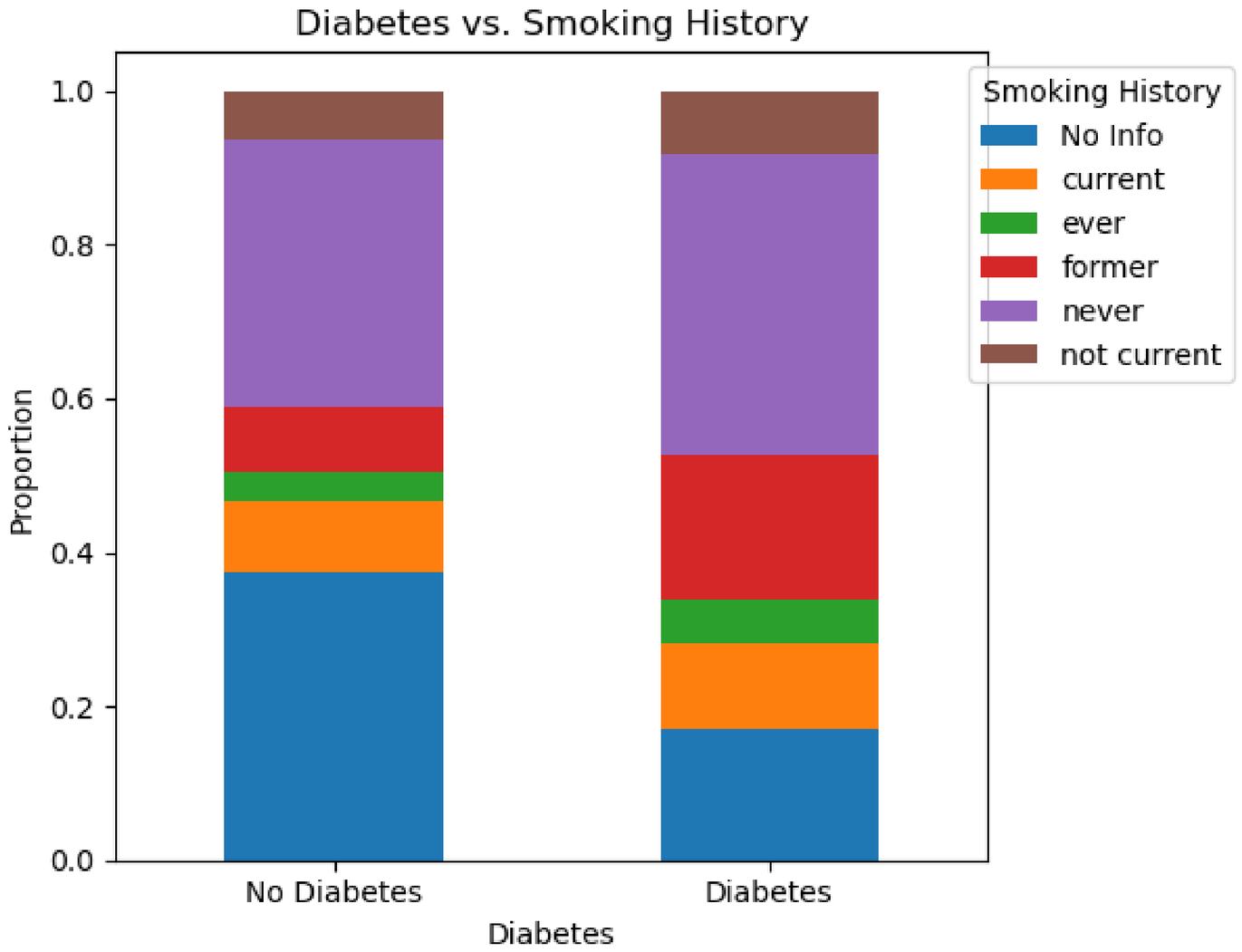
It appears that from the age of 40 onwards most people have a likelihood of having diabetes

What Gender has more occurrences of Diabetes ?

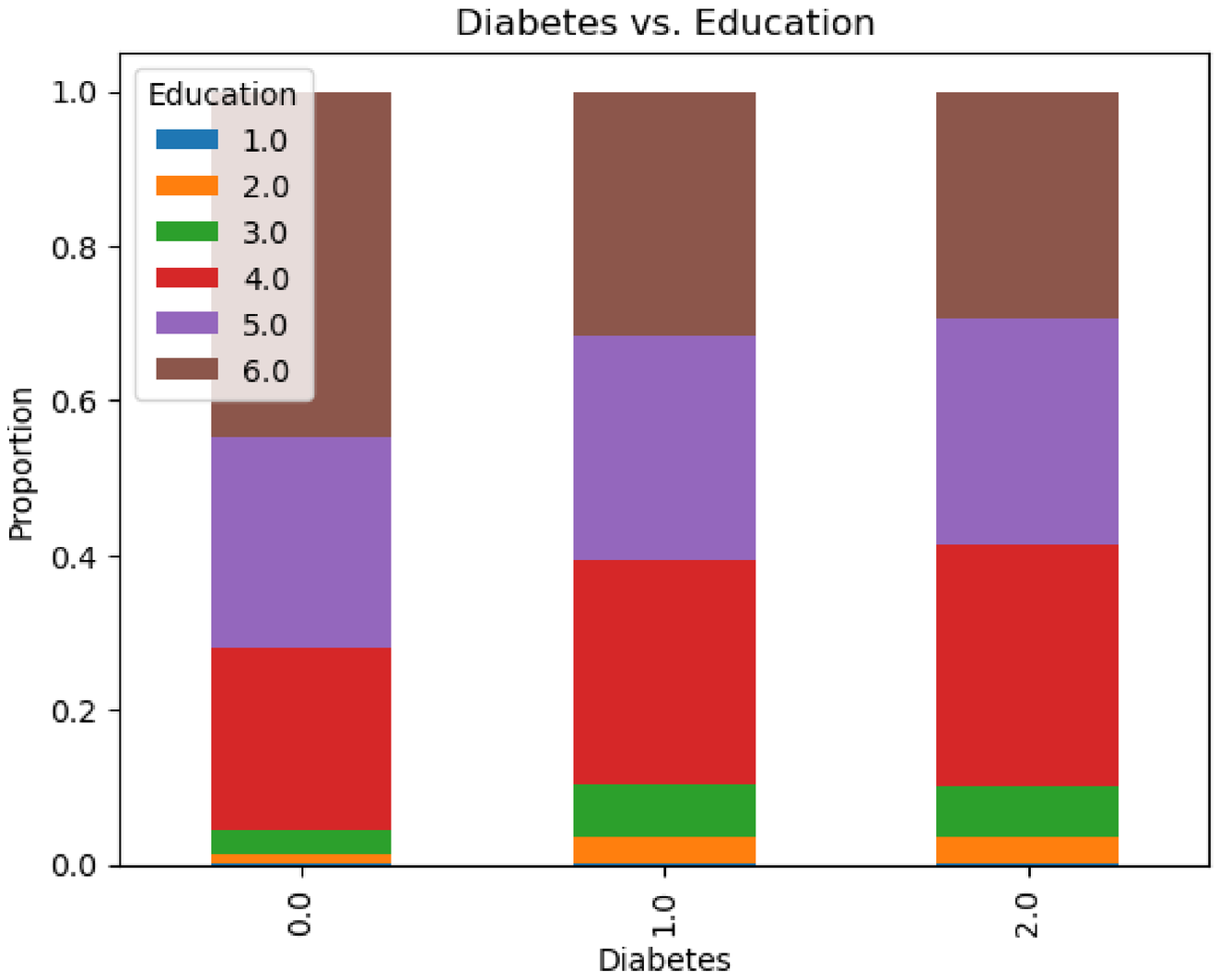


It was observed there were more cases of diabetes amongst men than women, especially after the age of 50. On further research, this could be attributed to the steady decline in the testerone hormone, which has been linked to increased chances in diabetes diagnosis.

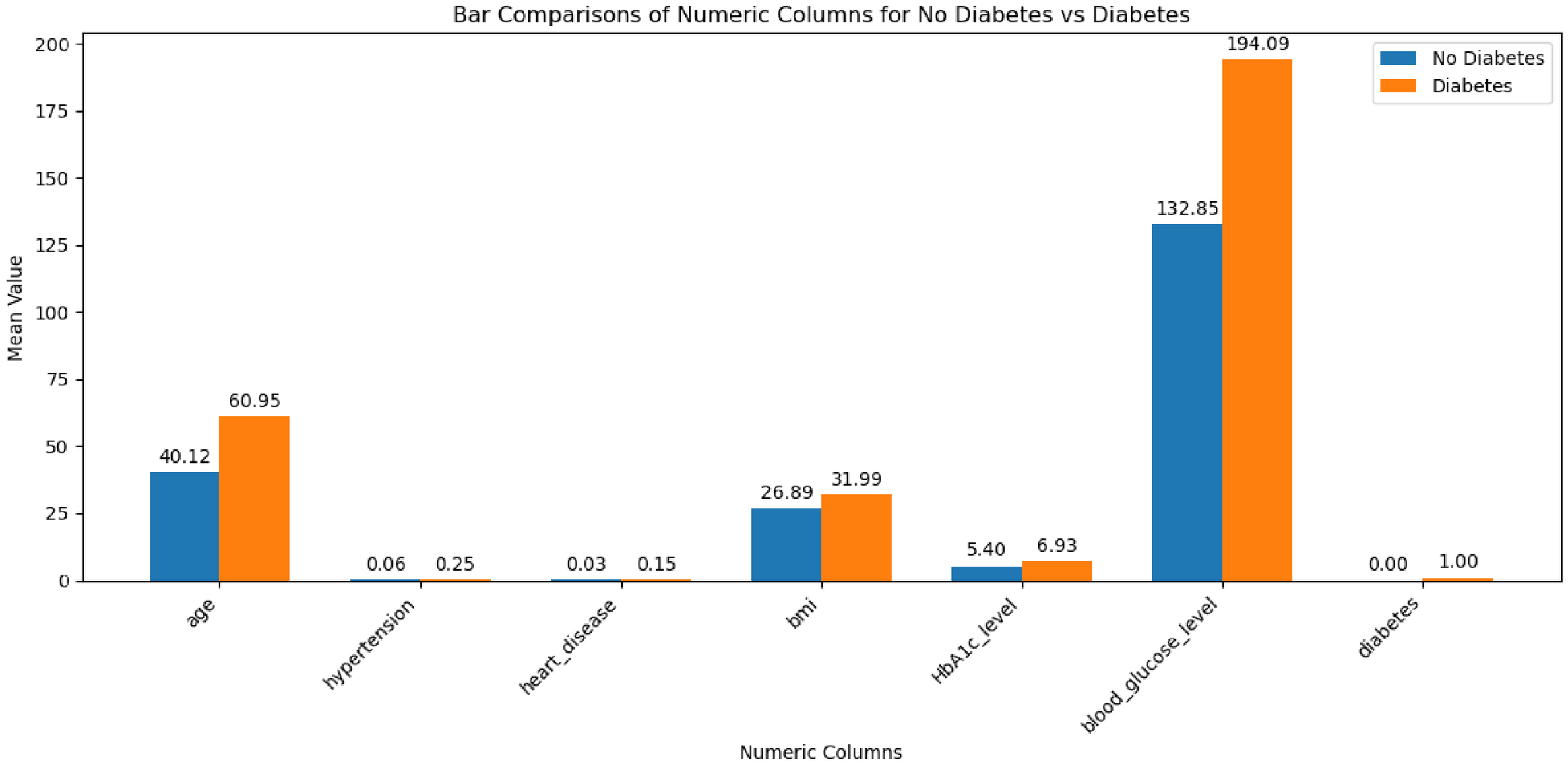
What's the smoking comparison between those with diabetes and no_Diabetes ?



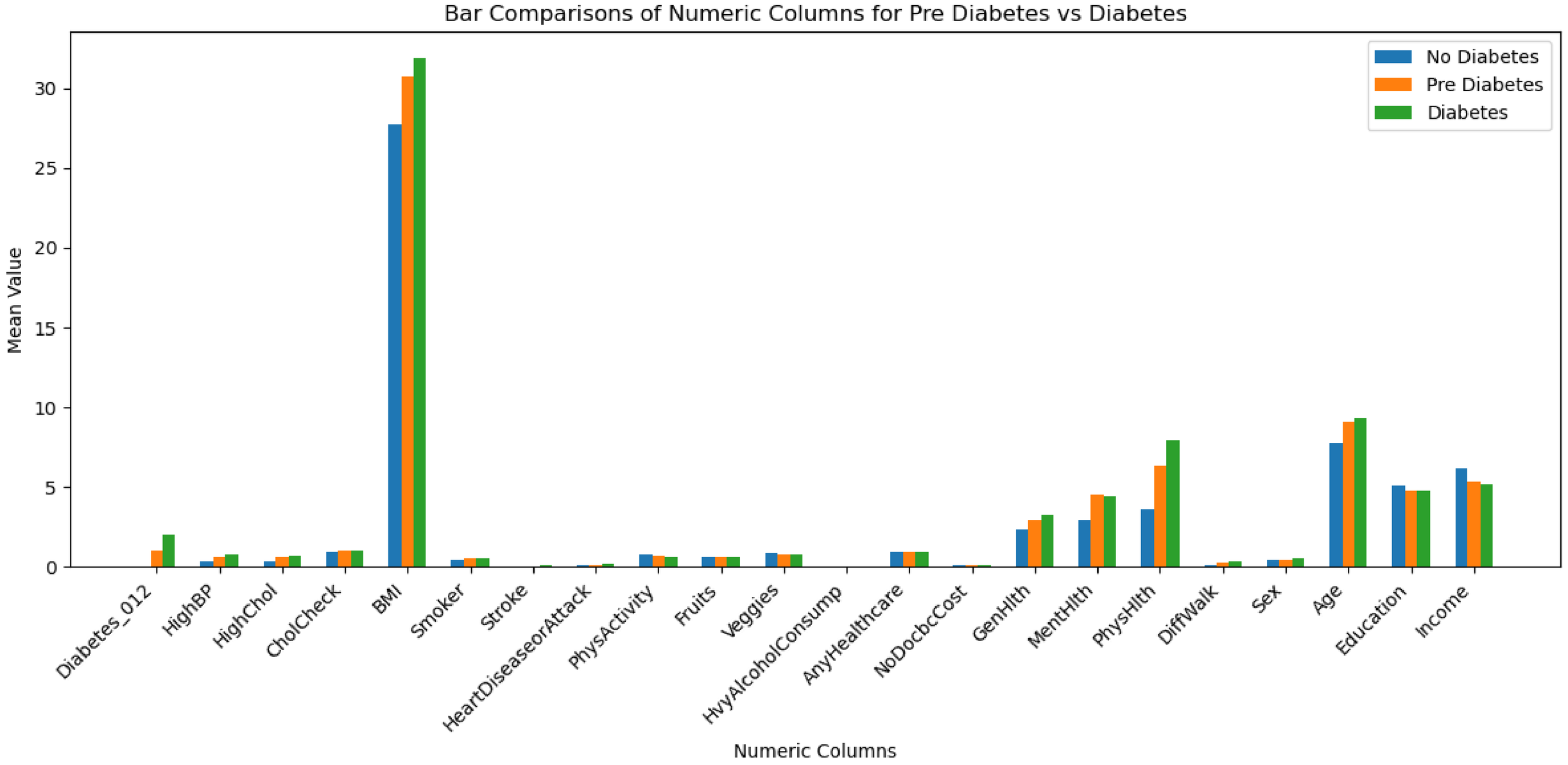
What's the comparison of education levels and those with diabetes and no_Diabetes ?

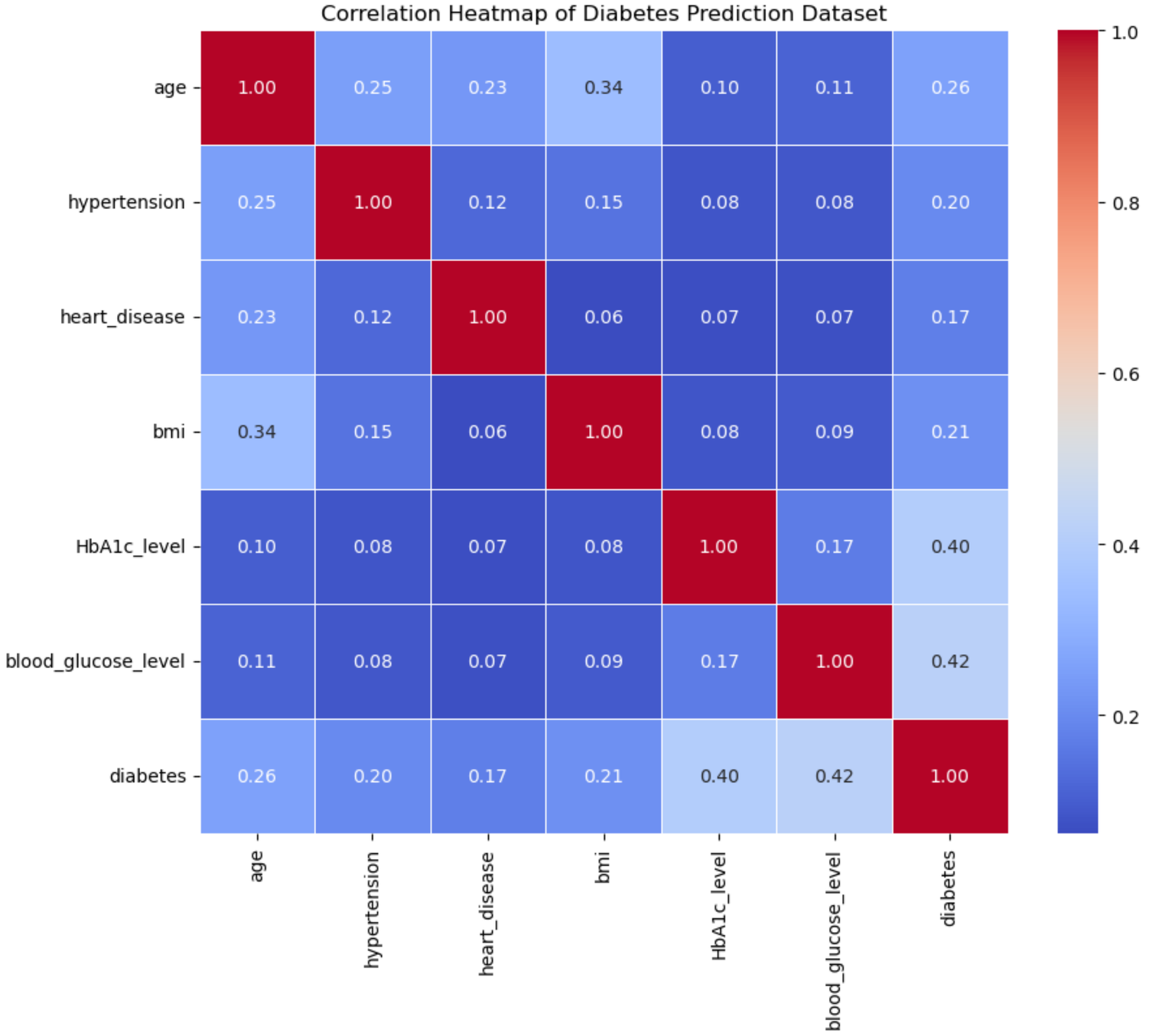


Comparisons between those with diabetes and no_Diabetes ?



Comparisons between those with diabetes and no_Diabetes ?





Correlation of all the factors

Modelling

XGBOOST

CNN MODEL

SVM MODEL

Decision Tree

Model Evaluation

XGBOOST

Precision :
0.99
Recall :
0.84
F1 Score :
0.84

CNN

Precision :
0.98
Recall :
0.67
F1 Score :
0.80

SVM MODEL

Precision :
0.89
Recall :
0.89
F1 Score :
0.89

Decision Tree

Precision :
0.96
Recall :
0.96
F1 Score :
0.96

Function that prompts user to input gender, age,...and returns a prediction based on the input

model : **Decision Tree**

```
predict_diabetes(model)
```

```
Enter gender (Male/Female): Female
Enter age: 60
Enter hypertension (0 for No, 1 for Yes): 0
Enter heart disease (0 for No, 1 for Yes): 0
Enter smoking history (never/No Info/current/former/ever/not current): former
Enter BMI: 9
Enter HbA1c level: 6.5
Enter blood glucose level: 200
Based on the input, the person is predicted to NOT have diabetes.
```

```
predict_diabetes(model)
```

```
Enter gender (Male/Female): Female
Enter age: 60
Enter hypertension (0 for No, 1 for Yes): 1
Enter heart disease (0 for No, 1 for Yes): 0
Enter smoking history (never/No Info/current/former/ever/not current): ever
Enter BMI: 27
Enter HbA1c level: 7
Enter blood glucose level: 150
Based on the input, the person is predicted to have diabetes.
```

Key Challenges

- Imbalanced dataset
- Model generalization to diverse patient populations

CONCLUSIONS

The gender with more occurences of diabetes are Females.

Most smokers seem to quit smoking after being diagnosed with diabetes this is because smoking habits have a probability of causes smoking is a significant risk factor for developing type 2 diabetes.

As income increases there are lesser people with diabetes these could be correlated with their ability to lead healthier lifestlyes .

Those with higher level of education also have lesser occurences of diabetes this could be associated by their ability to do better research or an understnding of the importance to led healthier lifestyles.

RECOMMENDATIONS

Collection of a more balanced data(no diabetes and diabetes) would produce a better performing model that wont be biased after training.