

Diabetes Visualisation & Insights Report

Prepared by
[Team 10 – Mellitus]



MELLITUS

Table of Contents

1	OVERVIEW	3
1.1	BACKGROUND	3
1.2	KEY FINDINGS	3
1.3	ACTIONABLE INSIGHTS	3
2	HEALTH FACTORS	3
2.1	KEY FINDINGS	3
2.2	ACTIONABLE INSIGHTS	4
3	LIFESTYLE FACTORS	4
3.1	KEY FINDINGS	4
3.2	ACTIONABLE INSIGHTS	4
4	DIABETES RISK	4
4.1	KEY FINDINGS	4
4.2	ACTIONABLE INSIGHTS	5
5	SUMMARY	5

1 Overview

1.1 Background

Diabetes is a growing concern, and understanding its patterns is necessary for prevention and management. By analysing the data from 100,000 patients, this report dives into the key trends surrounding diabetes, offering actionable recommendations for patients. The goal here was to make the data meaningful and help inform ways to get better health outcomes.

1.2 Key Findings

- **Diabetes Prevalence:** Out of 100,000 patients, **95,650** are diabetic, which is an alarmingly high percentage.
- **BMI and Age:** The average BMI for diabetic patients is **27.0**, categorizing most as overweight, and the average age is **45 years**. This places middle-aged patients at the highest risk.
- **Gender Split:** Diabetes affects **55% females** and **45% males**, showing a slight predominance in females.
- **Family History:** About **24% of diabetic patients** have a family history of diabetes, pointing to the importance of genetics.

1.3 Actionable Insights

- Patients, especially middle-aged adults, should consider **regular diabetes screenings** to catch the condition early.
- Maintaining a **healthy BMI (below 25)** can significantly reduce the risk.
- Patients with a family history of diabetes should focus on **preventative measures**, such as healthy eating and physical activity, to offset genetic predisposition.

2 Health Factors

The relationship between diabetes, hypertension, and other health factors stood out in the data:

2.1 Key Findings

- **Hypertension:** Among diabetic patients, **83,780** did not have hypertension, but **16,220** did. While most diabetics are not hypertensive, the 16% who are face compounded risks.
- **BMI:** Overweight (BMI 25–30) and obese patients (BMI > 30) dominate the diabetic population, while underweight patients have the lowest prevalence.
- **Stress Levels:** Elevated and extreme stress levels were reported in **30,000 diabetic cases**, indicating that stress plays a significant role.

- **Alcohol Consumption:** Moderate alcohol consumption was observed in **44.96%** of diabetic patients, followed by light (**37.13%**) and heavy (**17.49%**) drinking.

2.2 Actionable Insights

- For those with **hypertension**, managing blood pressure through lifestyle changes or medication is key to lowering overall health risks.
- Patients should work towards achieving a **BMI below 25**, which could reduce the strain on their metabolic health.
- Managing stress through practices like mindfulness or therapy is essential for reducing diabetes risk.
- Limiting alcohol intake can help prevent further health complications.

3 Lifestyle Factors

Lifestyle factors are some of the most modifiable contributors to diabetes risk.

3.1 Key Findings

- **Physical Activity:** Sedentary lifestyles dominate among diabetic patients, especially in middle-aged and senior groups. Very active patients showed significantly lower prevalence rates.
- **Sleep Patterns:** Those sleeping fewer than 6 hours per night reported higher diabetes prevalence compared to patients sleeping 7–8 hours.
- **Social Media Usage:** Moderate and occasional social media users showed higher diabetes rates, possibly linked to sedentary behaviors.

3.2 Actionable Insights

- Patients should aim to get at least **150 minutes of moderate exercise per week**, such as brisk walking or cycling, to reduce risk.
- Improving **sleep hygiene** by creating consistent sleep schedules and limiting screen time before bed can help regulate blood sugar levels.
- Patients should balance their online and offline activities by incorporating more physical and social offline engagements.

4 Diabetes Risk

The dataset's predictive analysis sheds light on high-risk groups and potential interventions.

4.1 Key Findings

- **High vs. Low Risk:** Out of the diabetic population, **3,261 patients** are classified as high-risk due to their BMI, family history, and lifestyle, while **96,739 are low-risk**.

- **Diet and BMI Correlation:** Atkins, pescatarian, and ketogenic diets correlate with higher BMIs, while vegan and Mediterranean diets are associated with lower BMIs.
- **Pregnancy:** Diabetic pregnancies averaged **0.78 pregnancies per patient**, emphasizing the need for gestational diabetes monitoring.

4.2 Actionable Insights

- High-risk patients should **consult healthcare providers** for tailored plans to manage their risk factors.
- Shifting to diets like **Mediterranean or plant-based diets** could help lower BMI and improve metabolic health.
- Pregnant patients should undergo regular **gestational diabetes screenings** and follow dietary recommendations.

5 Summary

After analysing the dataset, it's clear that diabetes is a complex issue influenced by health metrics, lifestyle, and genetics. To summarise the factors:

1. **Prevalence:** Diabetes affects **95,650 patients**, with the highest risk among middle-aged, overweight patients.
2. **Hypertension:** **16% of diabetic patients also have hypertension**, emphasizing the importance of managing blood pressure.
3. **Stress and Sleep:** Stress and insufficient sleep are significant contributors, with **30% of diabetic patients** reporting extreme stress.
4. **Lifestyle:** Sedentary lifestyles dominate among diabetic patients, while physical activity and good sleep patterns correlate with lower risk.

Conclusion and Recommendations

For patients at risk of developing diabetes, the data points to actionable steps that can significantly lower risk:

1. **Maintain a Healthy BMI**
 - Aim for a BMI below 25 through a balanced diet and regular physical activity.
2. **Increase Physical Activity**
3. **Adopt a Healthier Diet:**
 - Adopt diets rich in vegetables, whole grains, and lean proteins, such as a mediterranean diet.
 - Reduce processed foods and high-carb meals that contribute to weight gain.
4. **Improve Sleep Hygiene:**

- Try to sleep for 7–8 hours per night.

5. Manage Stress and Mental Health:

- Have hobbies that reduce stress levels.

6. Limit Alcohol Consumption

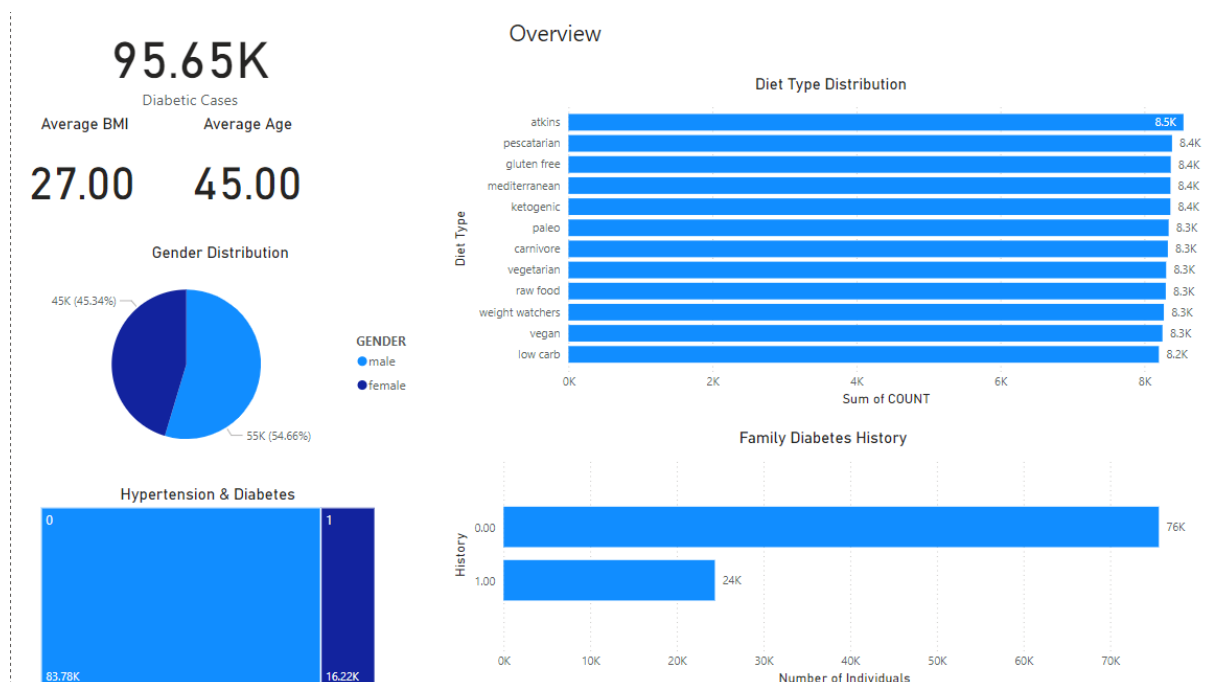
7. Focus on High-Risk Groups:

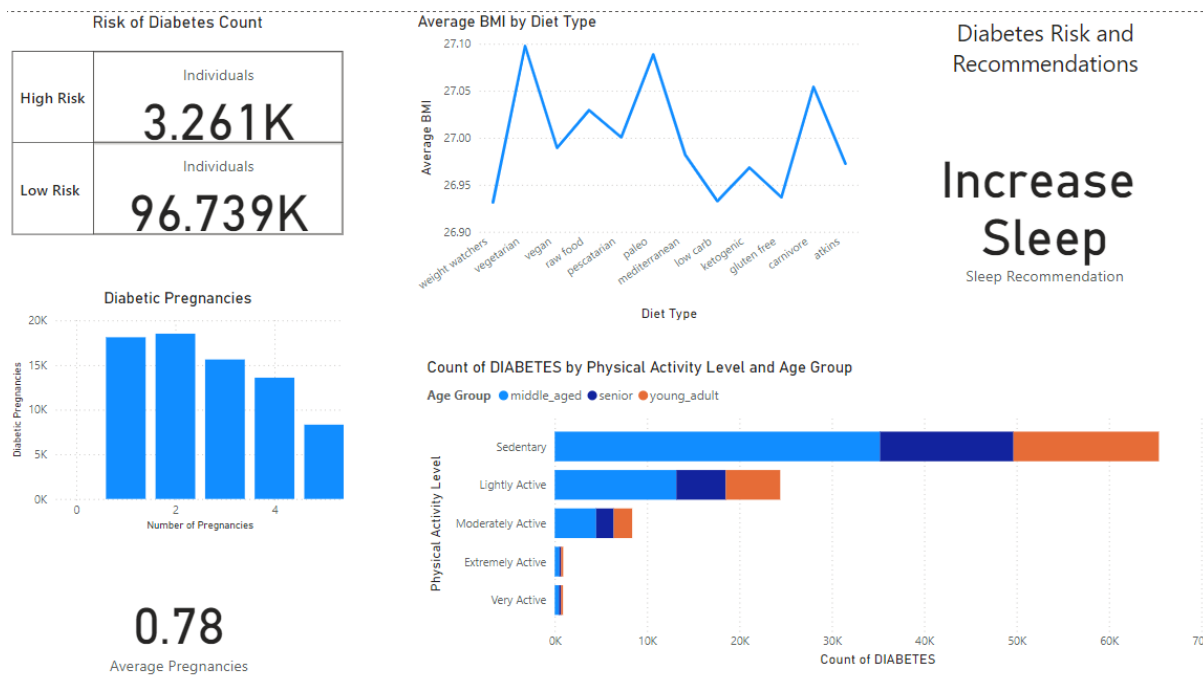
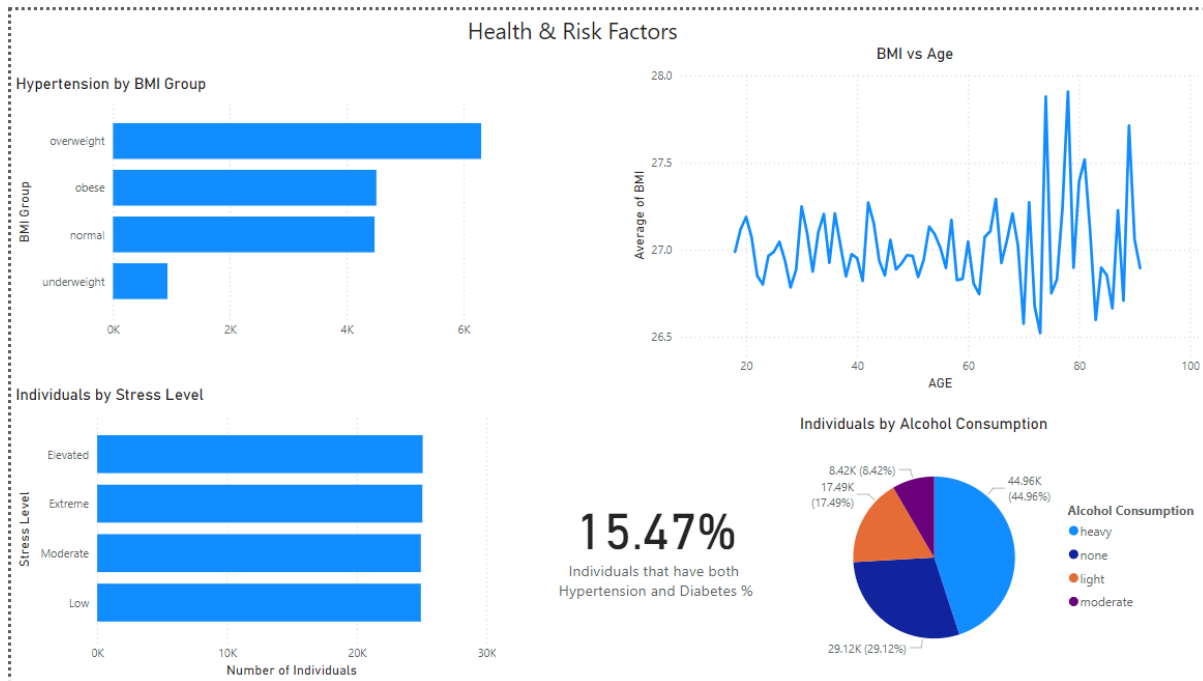
- Patients with a family history of diabetes, sedentary lifestyles, or poor dietary habits should prioritize preventative care, including regular health screenings.

By making small but consistent changes, patients can lower their diabetes risk and improve their overall quality of life.

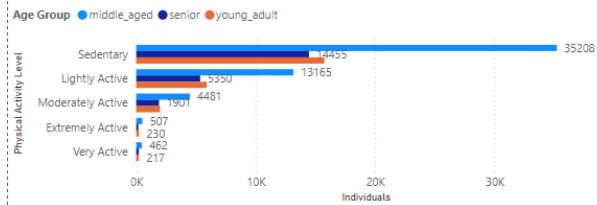
There are significant implications for the diabetes drugs company. The high prevalence of diabetes among males with sedentary lifestyles, elevated stress, and heavy alcohol consumption presents a substantial market opportunity. By focusing on the top predictors, the company can develop targeted medications and personalised treatment plans tailored to this demographic. This data-driven approach can enhance patient outcomes, expand market reach, and reinforce the company's position as a leader in diabetes care.

Appendix:

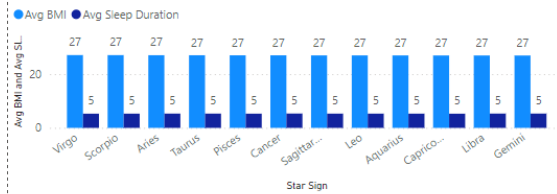




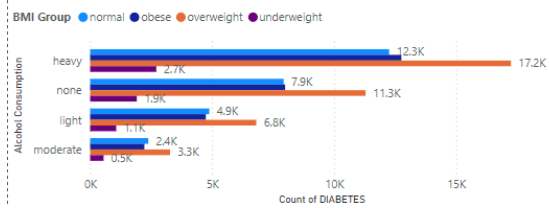
Individuals by Physical Activity Level and Age Group



Avg BMI and Avg Sleep Duration by Star Sign

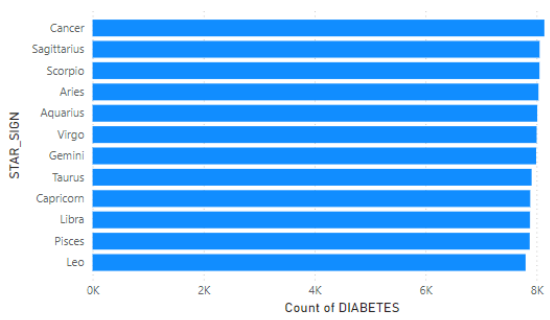


Count of DIABETES by Alcohol Consumption and BMI Group

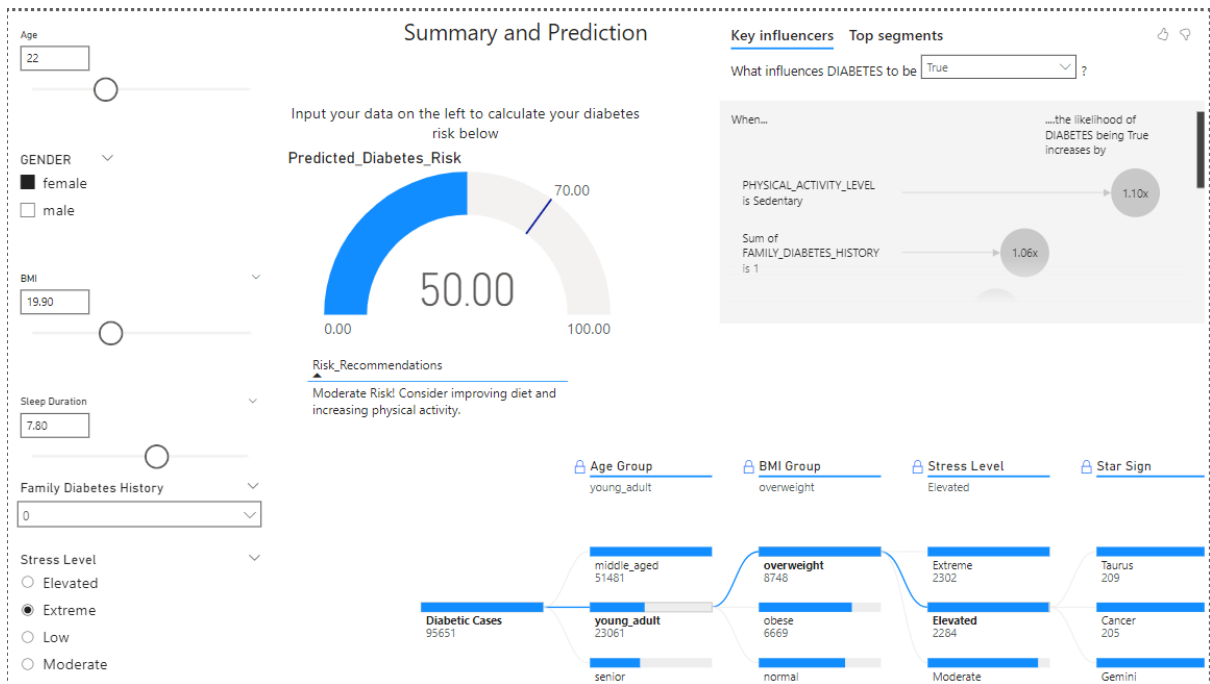
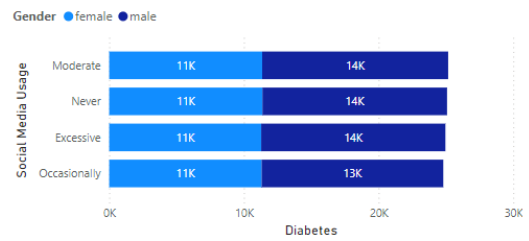


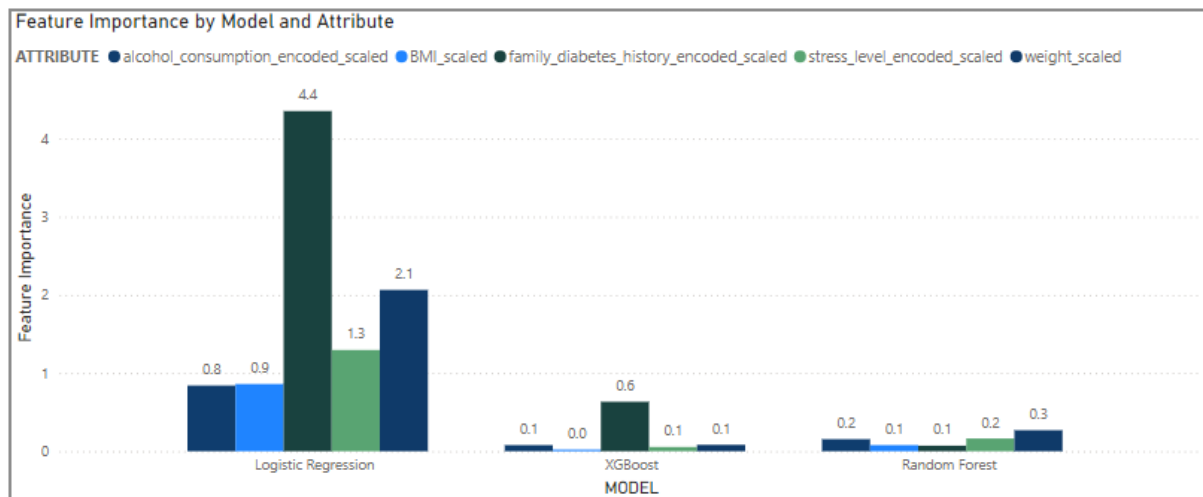
Activity and Lifestyle Insights

Count of DIABETES by STAR_SIGN



Diabetes by Social Media Usage and Gender





ACCURACY	MODEL	AVG_ROC_AUC	F1_SCORE	MAX_ROC_AUC	MIN_ROC_AUC	PRECISION	RECALL
0.87	Logistic Regression	0.95	0.93	0.95	0.94	0.99	0.87
0.98	XGBoost	0.98	0.99	0.98	0.98	0.99	0.99
0.98	Random Forest	0.98	0.99	0.98	0.97	0.99	0.99