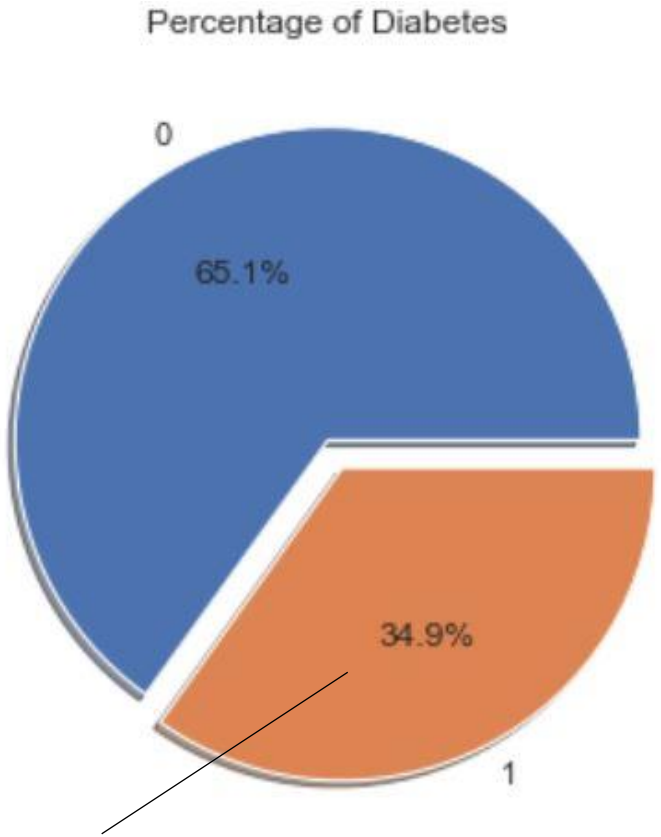
A study of the main causes of diabetes among Pima Indians

- Source:
- Kaggle
- https://www.kaggle.com/uciml/pima-indians-diabetes-database

Background & objective

- 768 diabetes tests were conducted among Pima Indian females. The results were recorded.
- Besides this, their age, glucose level, blood pressure, BMI, family history of diabetes, insulin level, No. of pregnancies and skin thickness measurements were recorded.
- The objective is to:
  - Understand the main causes for diabetes
  - To predict prevalence of any individual for diabetes

DIABETES RATES



35% tested positive for Diabetes

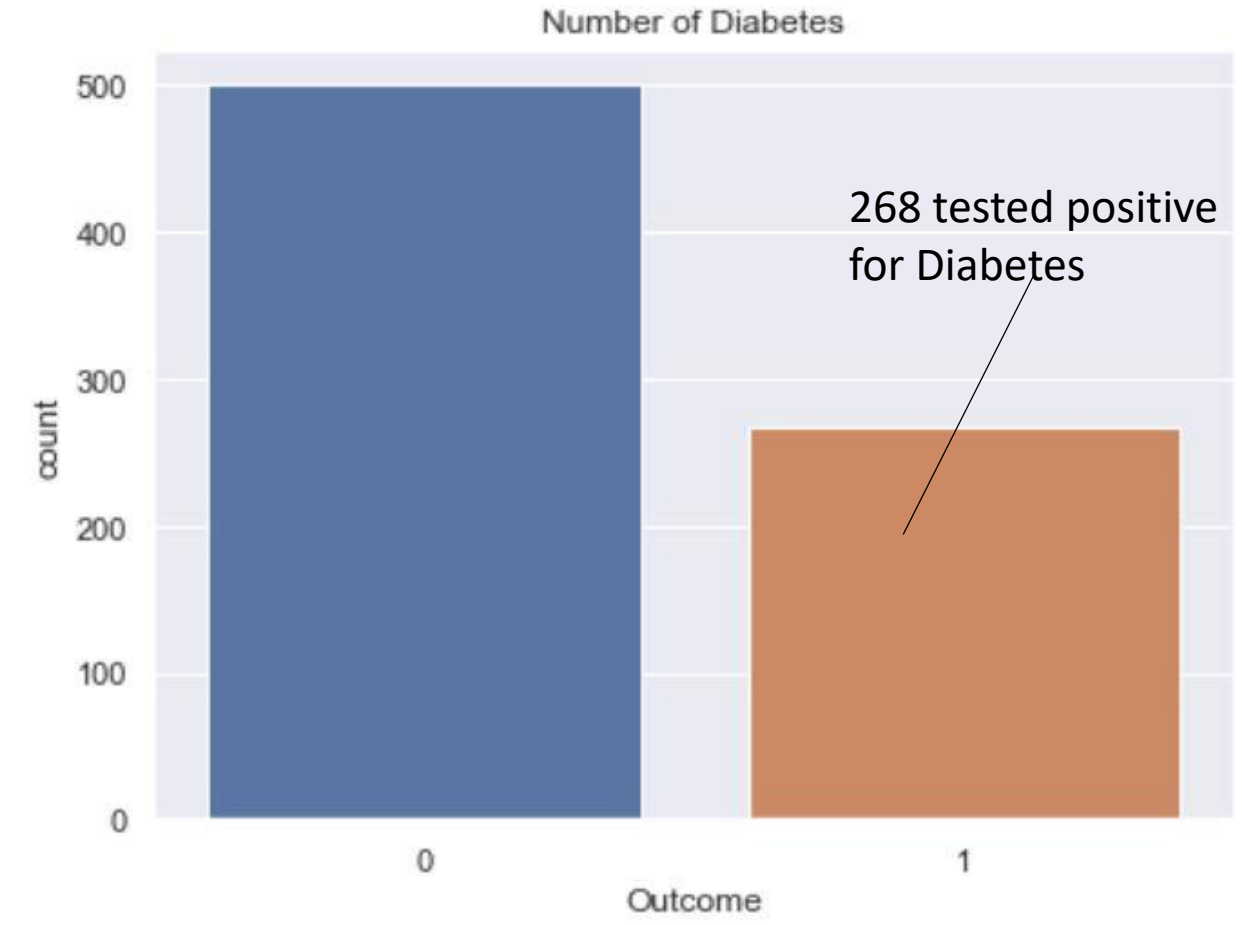


Fig 1

RANKING THE FACTORS OF DIABETES

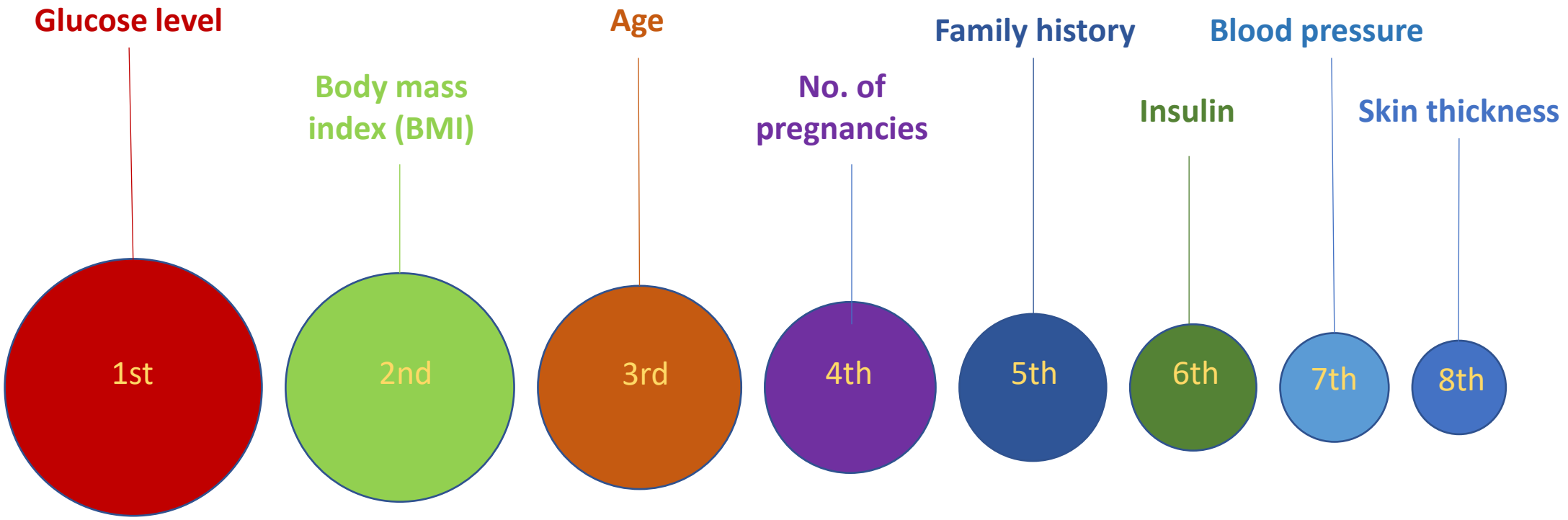


Fig 2

SEVERITY OF EACH FACTOR IN DIABETES

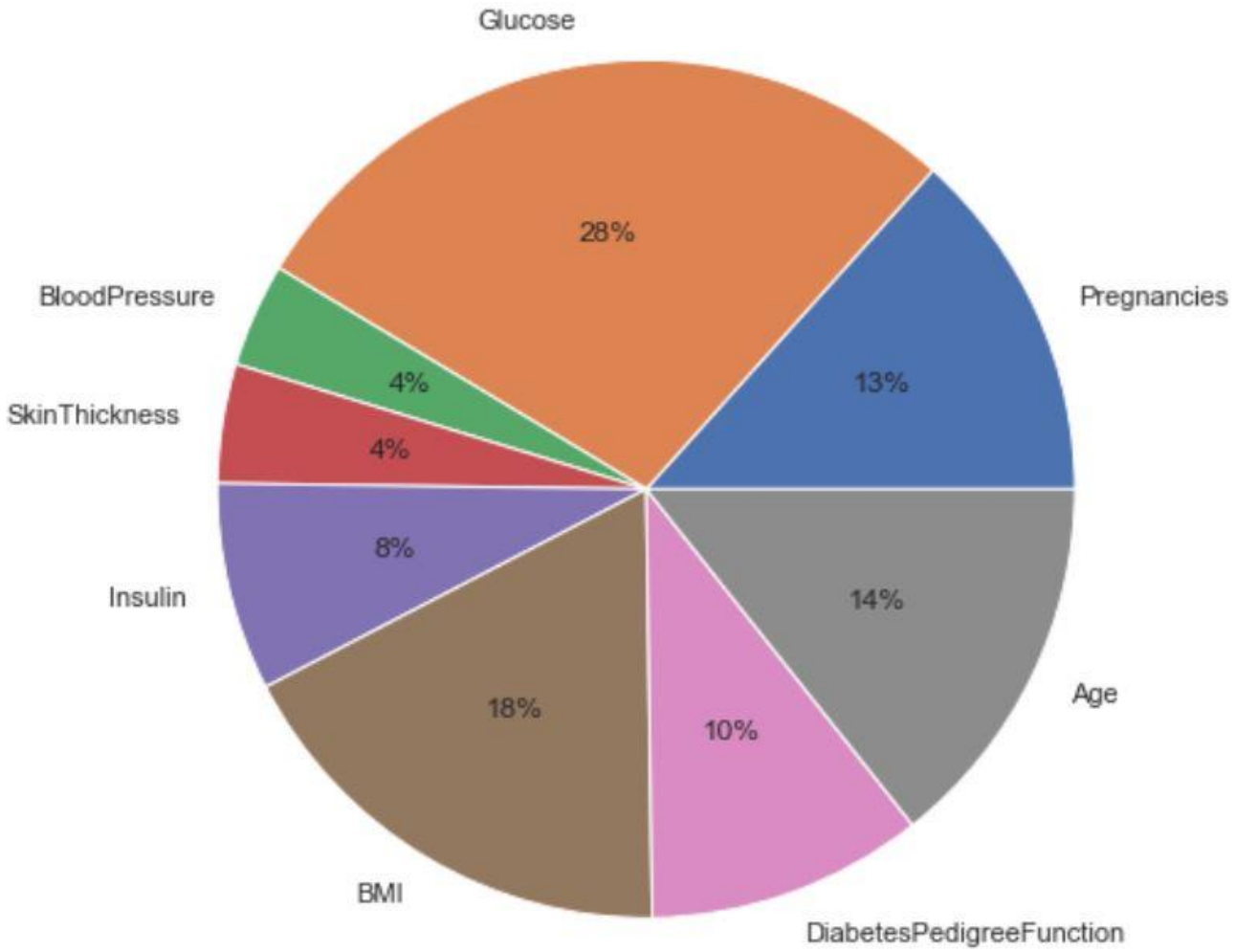


Fig 3

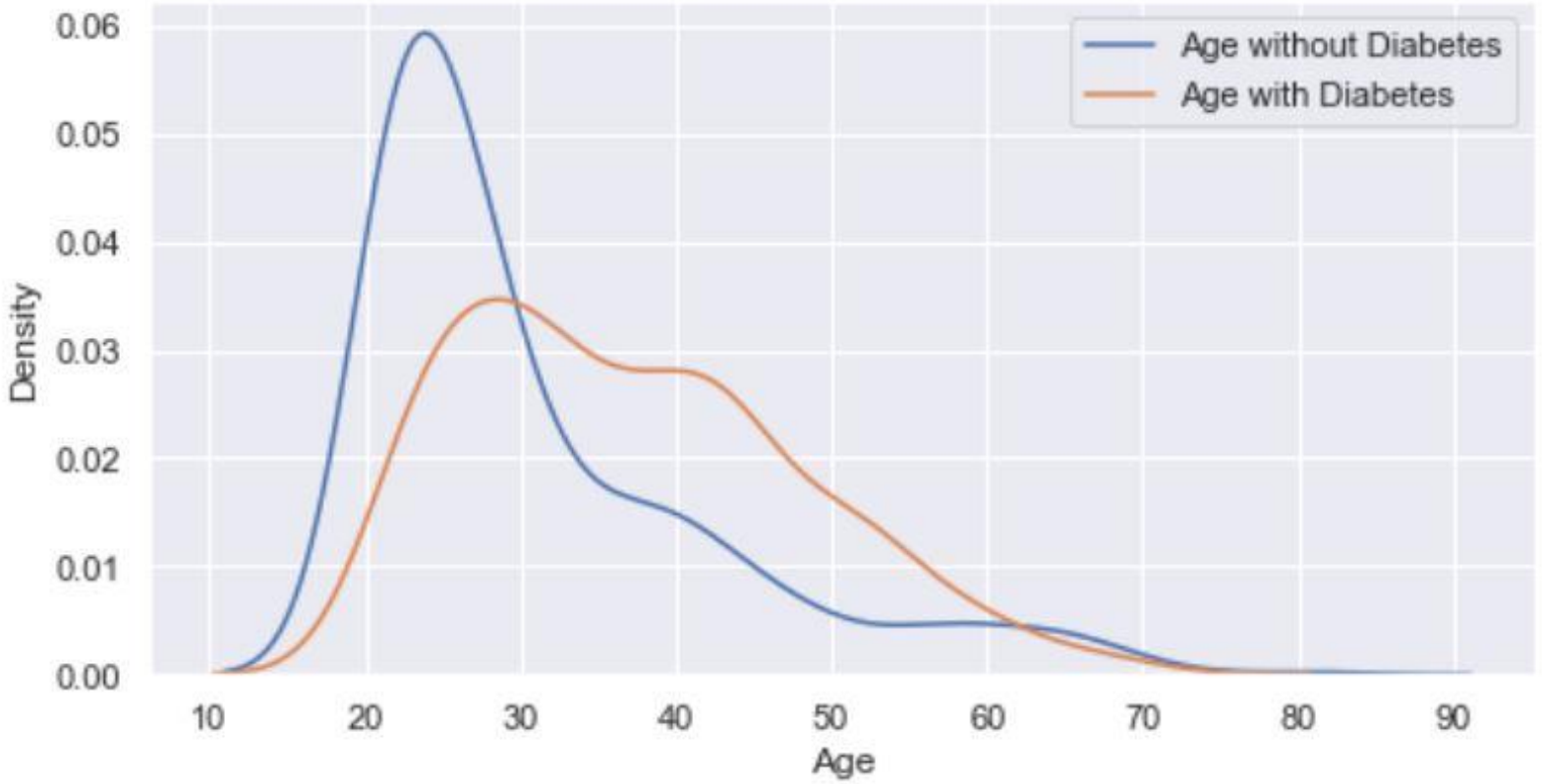
Glucose, BMI and Age Contributes to 60% of the Factors.

However, high Glucose is the result of high BMI.

This will also worsen with advancing Age and Pregnancies.

Insulin, high blood pressure and skin thickness is also a result of diabetes

AGE FACTOR AFFECTING DIABETES

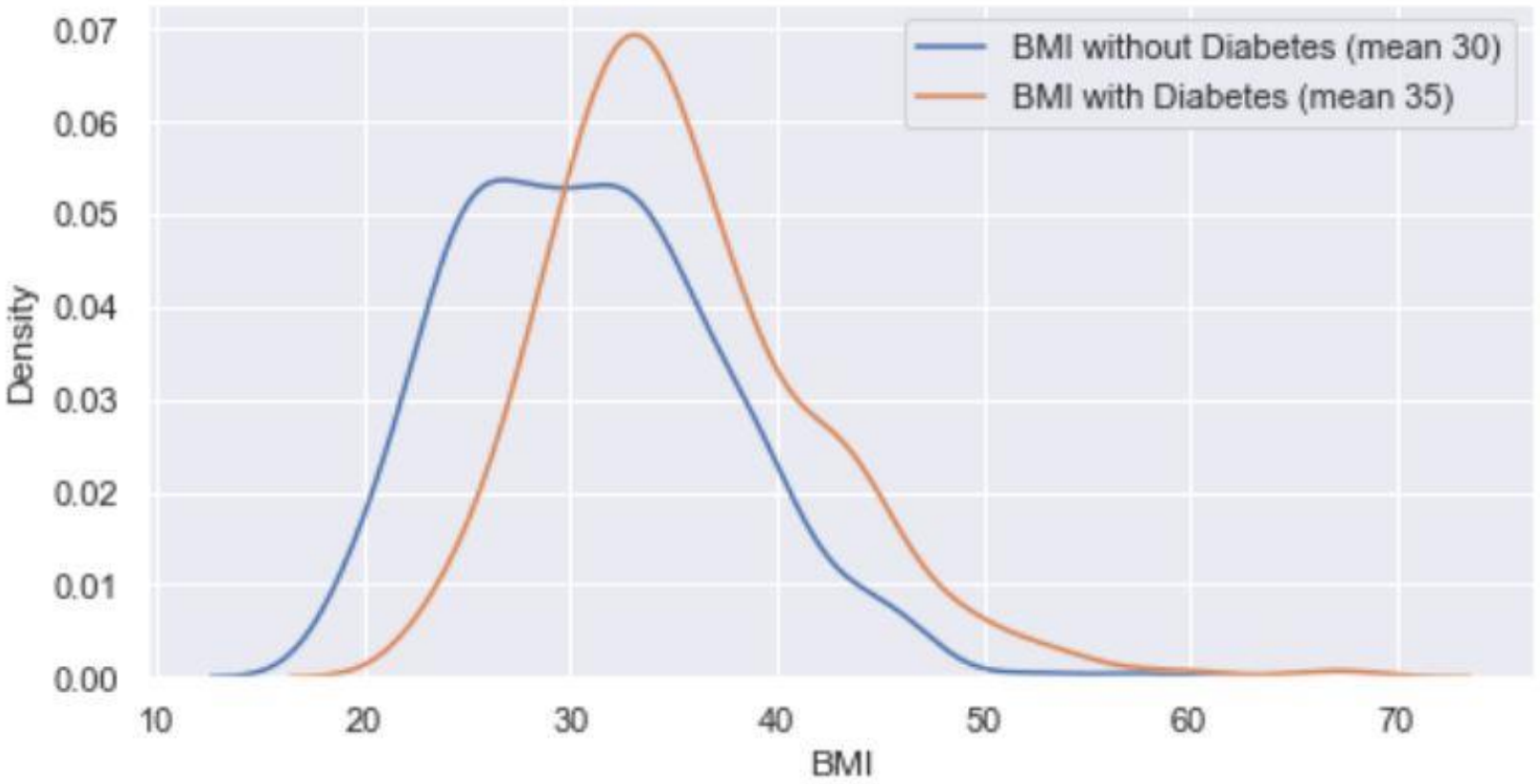


There are more diabetes incidents beyond the age of 30 as compared with those without diabetes.
For instance, for every 10 people having the age of 40, 7 will be tested positive.

On the other hand, at age 30, there are equal number of people tested positive and negative.

Fig 4

BMI FACTOR AFFECTING DIABETES



There are more diabetes incidents beyond the BMI of 30 as compared with those without diabetes.
For instance, for every 10 people with BMI of 40, 6 will be tested positive.

On the other hand there are lesser diabetes incidents below BMI of 30.

For every 10 people with BMI 25,

Fig 5

GLUCOSE AFFECTING DIABETES

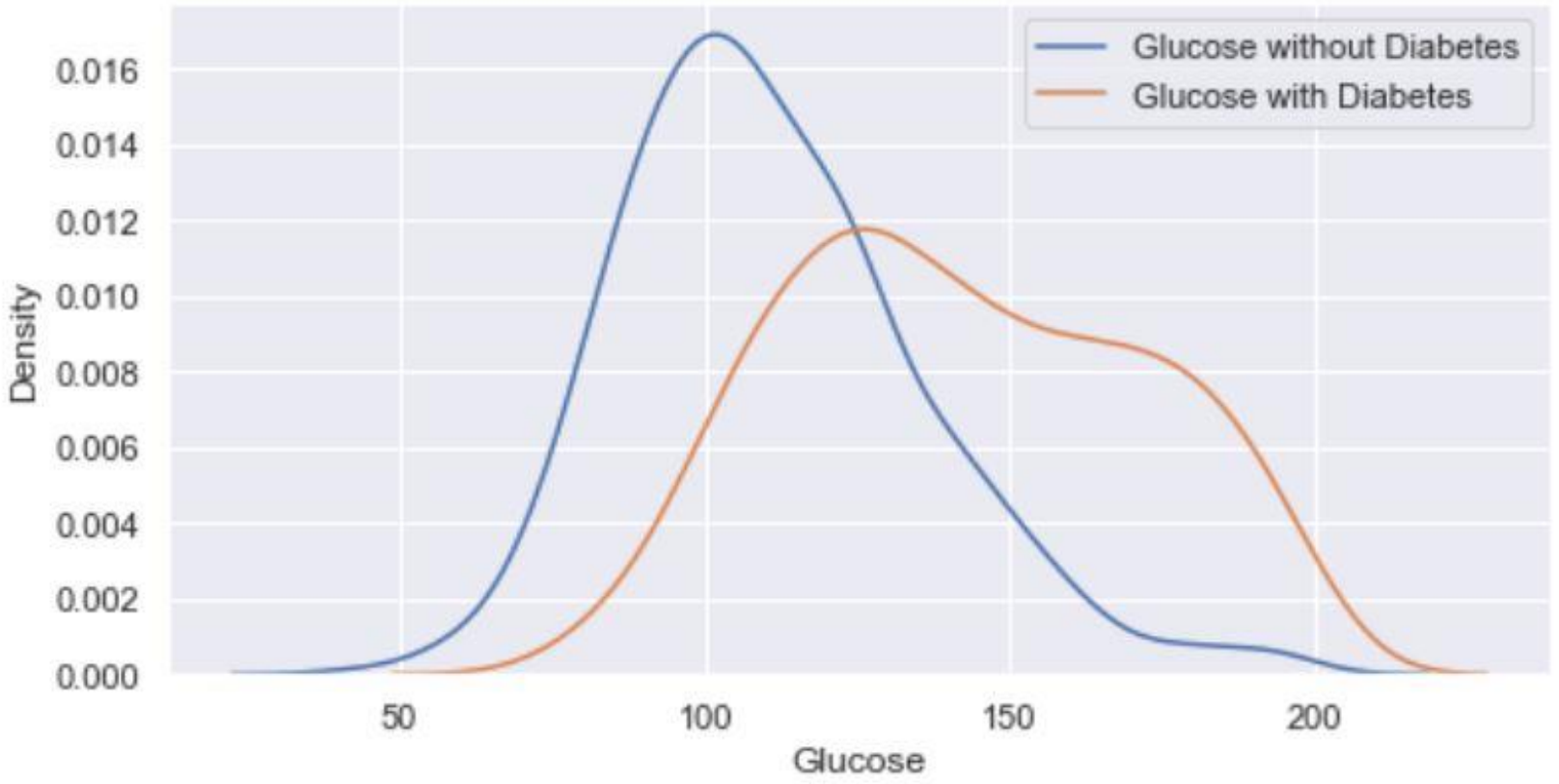
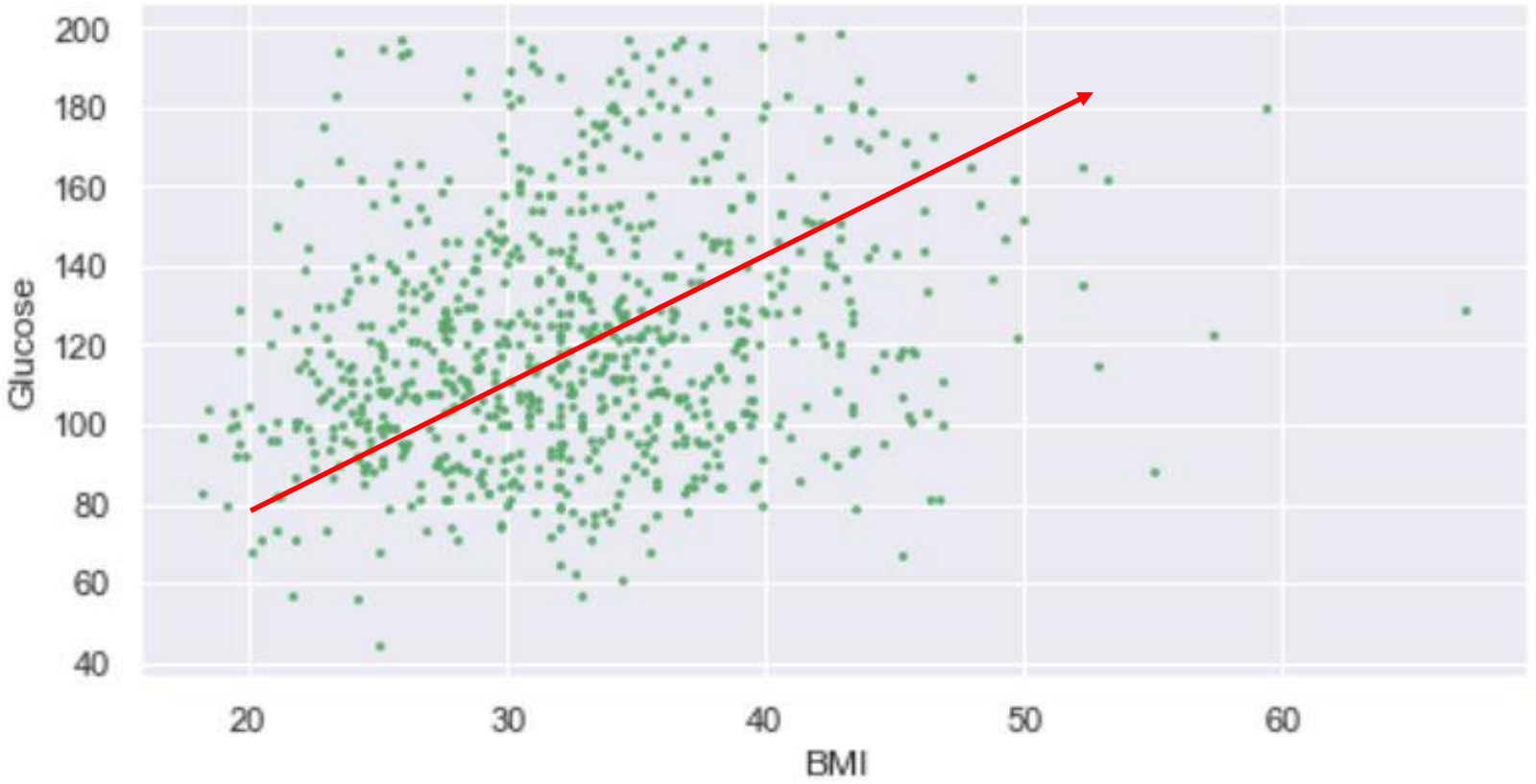


Fig 6

There are more diabetes incidents beyond the Glucose reading of 125 as compared with those without diabetes, of which the gap is at 175. For instance, if you have 10 people with reading of 175, 9 will be tested positive.

On the other hand there are lesser diabetes incidents below Glucose reading of 175, which gap is the widest at 100. For every 10 people, 4 will be tested positive.

ASSOCIATION OF GLUCOSE - BMI



Glucose increases with the increase in BMI.

As you can see from the red arrow, both Glucose and BMI increases together.

Fig 7

Diabetes is characterized by relatively **higher** Glucose and BMI readings.

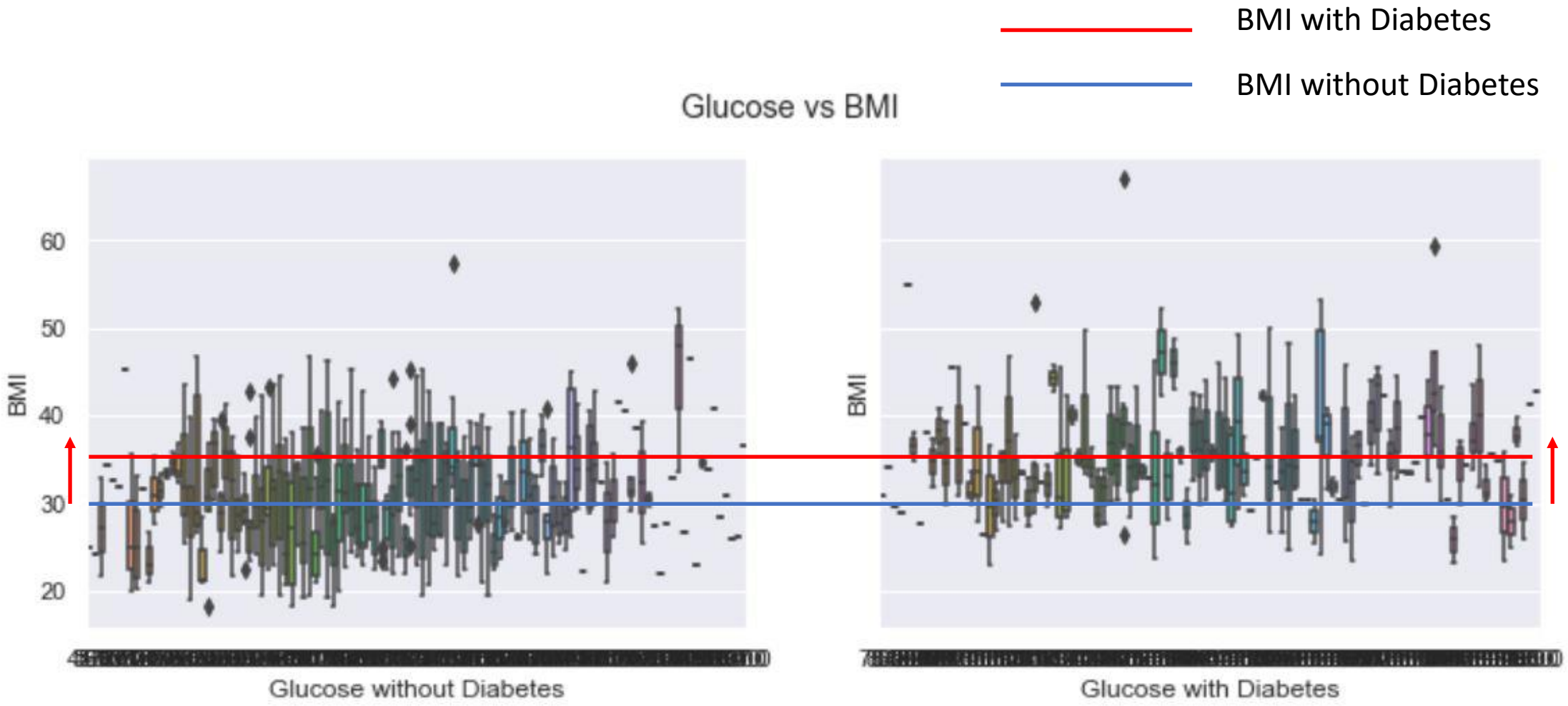


Fig 8

BMI of pregnant females are relatively higher for those tested positive for Diabetes

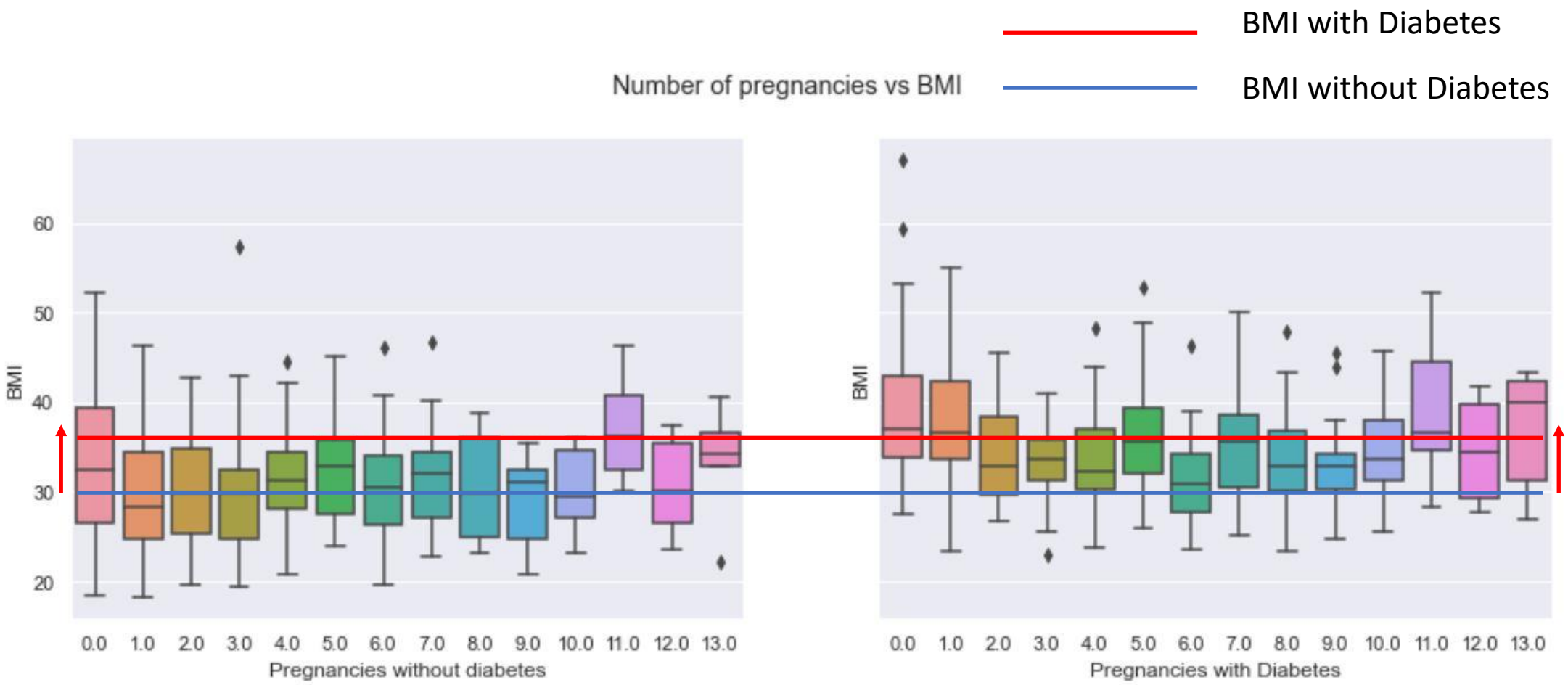


Fig 9

CONCLUSION

1. Obesity is the main cause for diabetes.
2. High Glucose level , BMI and Age contributes 60% to diabetes. (Fig 3)
3. High Glucose level is a result of high BMI which is obesity and therefore have a direct relationship with each other. (Fig 7)
4. Those who have tested positive have BMI's of 5 points higher than those tested negative. (Fig 5)
5. 93% of females have BMI greater than 22.6 which is pre-diabetes stage. 38% of females have BMI greater than 30 which is considered obese.

CONCLUSION (con’t)

1. Those who have tested positive have higher Glucose and BMI than those tested negative. (Fig 8)
2. Those with Glucose level > 130 have greater risk of diabetes. (Fig 6)

PREDICTING DIABETES

- If we have a person with the following records. How likely will she have diabetes? key in the figures in attached file "Diabetes classification-using Logistic Regression"

No.	Age	Family history (Diabetes)	Body Mass Index	Glucose level	Blood pressure	No. of Pregnancies	Skin Thickness	Insulin	Outcome
1	30	0.1	20	100	90	4	20	90	Negative
2	40	1	27	140	80	7	35	120	Negative
3	70	0.5	20	200	60	3	15	80	Positive
4	25	2.0	30	250	30	5	30	60	Positive
5	30	0.1	15	80	70	2	20	25	Negative