

# BMI and Glycemia Statistical Analysis

Statisticians World

August 8, 2024

## Importing the Data

In this section, we load a dataset containing patient BMI and glycemia levels.

```
# Set the working directory (modify this path if necessary)
setwd("C:/Users/0&1/OneDrive/Documents/R-Youtube")

# Load the dataset
my_data <- read.csv("BMI1.csv")

# Preview the data
head(my_data)
```

```
##   name gender glycemia  BMI
## 1    1      1        98 24.1
## 2    2      2       117 25.0
## 3    3      1        98 27.6
## 4    4      1        85 23.2
## 5    5      2       139 28.2
## 6    6      2       147 26.4
```

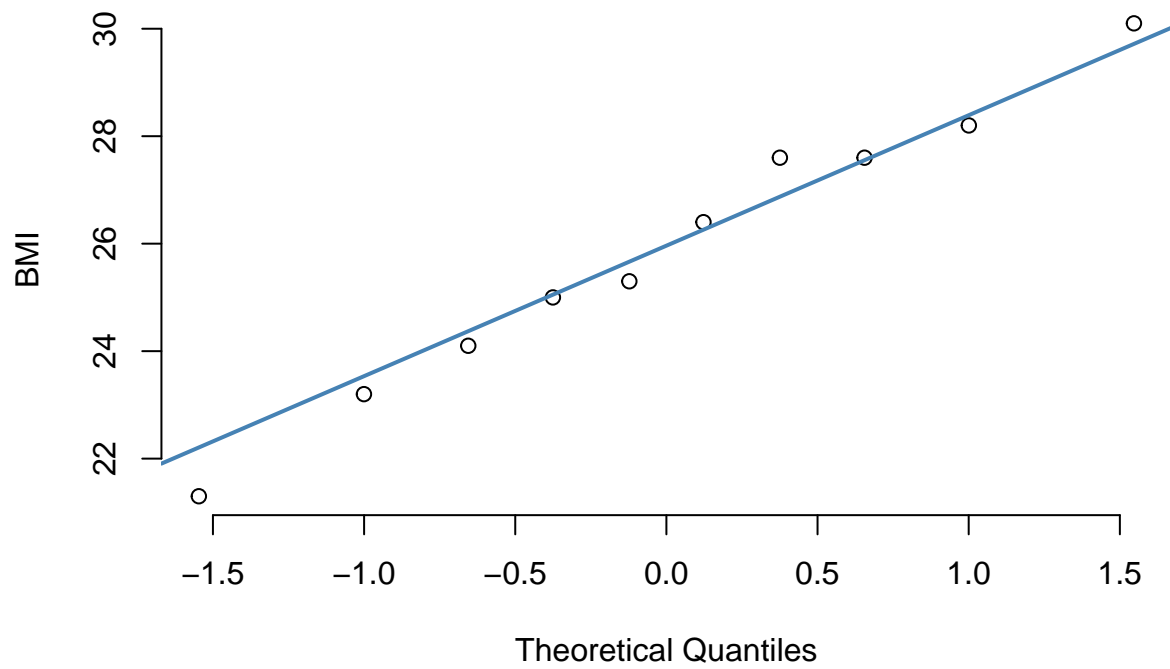
## Assessing Normality

We use Q-Q plots to visually check the normality of BMI and glycemia. A straight-line pattern indicates approximate normality.

### Q-Q Plot for BMI

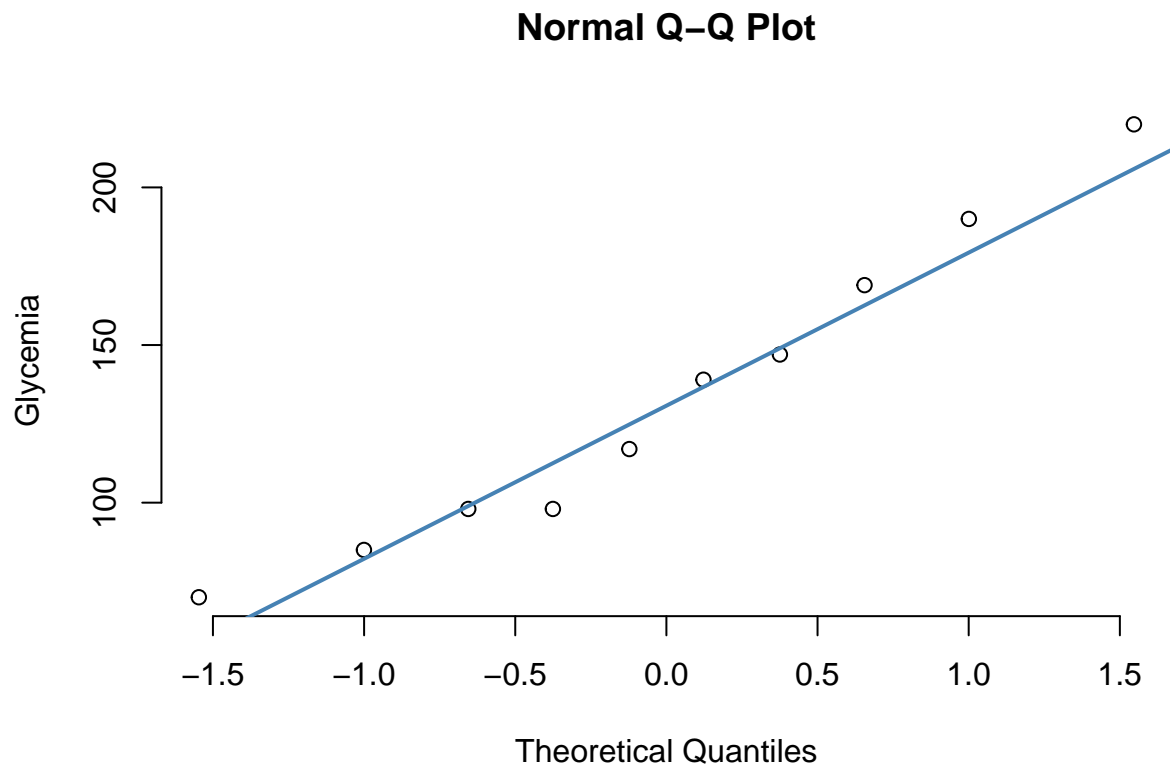
```
qqnorm(my_data$BMI, ylab = "BMI", pch = 1, frame = FALSE)
qqline(my_data$BMI, col = "steelblue", lwd = 2)
```

### Normal Q-Q Plot



### Q-Q Plot for Glycemia

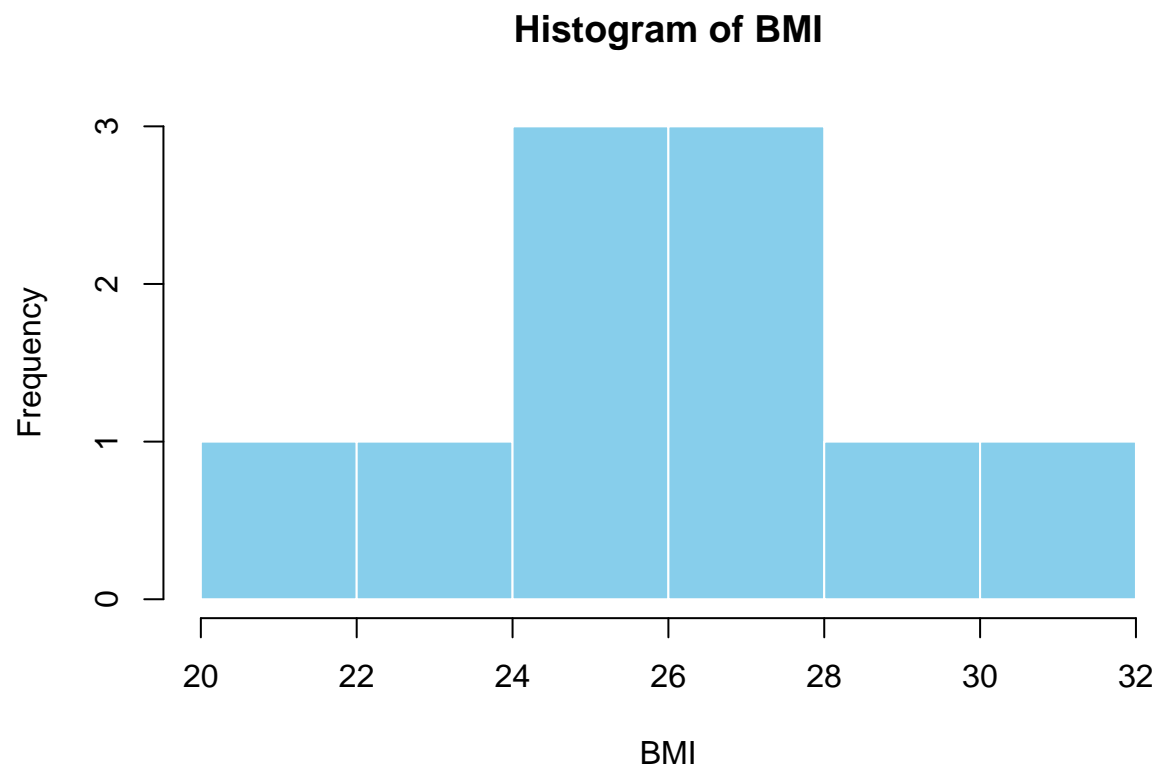
```
qqnorm(my_data$glycemia, ylab = "Glycemia", pch = 1, frame = FALSE)
qqline(my_data$glycemia, col = "steelblue", lwd = 2)
```



## Exploring the BMI Distribution

We use a histogram to examine the shape of the BMI distribution.

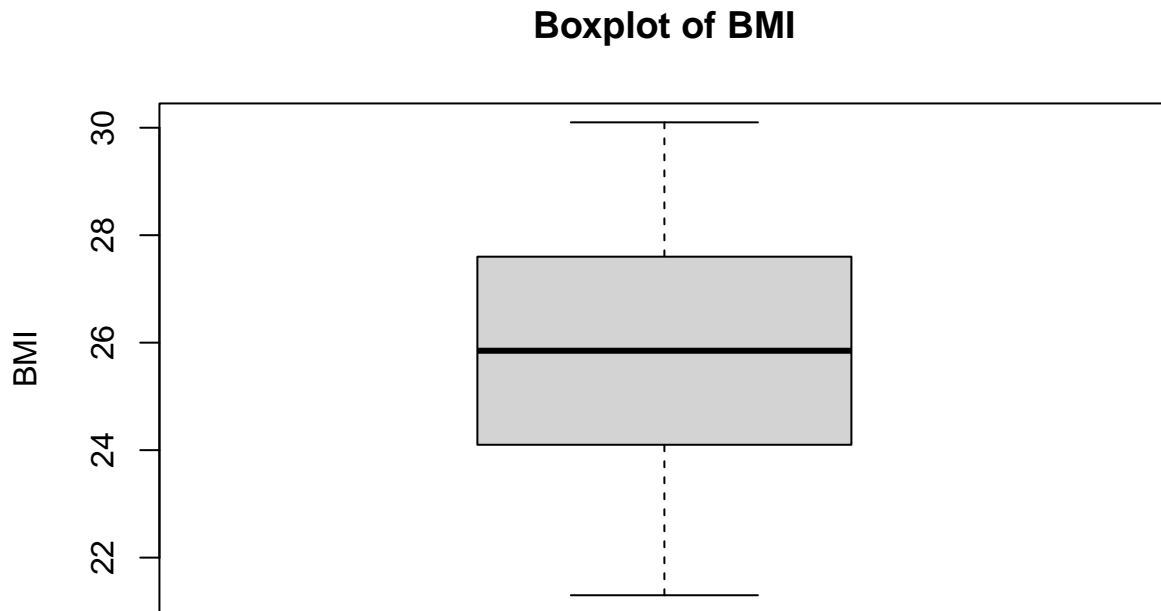
```
hist(my_data$BMI,  
     main = "Histogram of BMI",  
     xlab = "BMI",  
     ylab = "Frequency",  
     col = "skyblue",  
     border = "white")
```



## Detecting Outliers

A boxplot is useful for identifying potential outliers in BMI values.

```
boxplot(my_data$BMI,  
        ylab = "BMI",  
        main = "Boxplot of BMI",  
        col = "lightgray",  
        border = "black")
```



## One-Sample T-Test

We now perform a one-sample t-test to determine if the mean BMI significantly differs from a known population mean of 28.4.

### Hypotheses

Null hypothesis ( $H_0$ ): The mean BMI = 28.4

Alternative hypothesis ( $H_a$ ): The mean BMI  $\neq$  28.4

### Perform the T-Test

#### Set population mean

```
pop_mean <- 28.4
```

#### Perform the test

```
result <- t.test(my_data$BMI, mu = pop_mean)
```

## Output result

### result

5.3 Interpretation If the p-value is less than 0.05, we reject the null hypothesis, concluding that the mean BMI differs significantly from 28.4.

## Summary

We assessed normality of BMI and glycemia using Q-Q plots.

BMI distribution was visualized with a histogram and boxplot.

A one-sample t-test was conducted to compare the sample BMI to a population mean of 28.4.

Statistical results support inference about differences in the BMI distribution.

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