Hypothesis Testing

Goal of Analysis: The research team is trying to determine if an individual’s blood pressure has changed after exercising regularly for the past month (30-days).

A Hypothesis Test will be conducted on the dataset (BloodPressure) to determine the change in blood pressure of 25 individuals after exercising regularly for past 30 days. We will conduct the Two-tail test as we have to determine whether the blood pressure value has differed or not.

**Null Hypothesis**: There is no difference in blood pressure of individuals after exercising regularly for 30 days. That is, the sample mean is equal to the population mean.

**Alternate Hypothesis**: There is a change in the Blood Pressure level of individuals after exercising regularly for 30 days.

**Step 1**: Stating the null and alternative hypothesis

Ho: µ = 138.28

Ha: µ ≠ 138.28

**Step 2**: Specifying the significance level

Significance level α = 0.05

**Step 3**: Conducting Two-tail test

Calculating the z parameters;

µ0 = 138.28

µ = 130.28

α = 0.05

sigma (standard deviation) = 7.96

n = 25

z = (µ - µ0)/ (sigma / √n) = - 5.024

p – value = 5.046714e-07

**Step 4:** Here p- value of 5.046714e-07 is infinitesimally smaller than 0.05 confidence interval. That indicates the rejection of Null hypothesis.

**Conclusion:** We reject the Null Hypothesis (Ho) that is the sample mean is equal to the population mean at 0.05 significance level. Therefore, we accept the Alternate Hypothesis (Ha) that the sample mean differs from the population mean.

In other words, we conclude that the blood pressure values of 25 individuals have decreased after regularly exercising for past 30-days. Where, decrement is evident by the negative z-score value.

**R syntax for the Hypothesis Testing Exercise:**

View(BloodPressure)

head(BloodPressure)

mu0 <- mean(BloodPressure$Before)

mu0

sigma <- sd(BloodPressure$After)

sigma

n= length(BloodPressure$After)

n

mu <- mean(BloodPressure$After)

mu

z <- (mu-mu0)/(sd/sqrt(n))

z

p <- 2\*pnorm(abs(z), lower.tail = FALSE)

p

