2 Means Hypothesis Test List

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Assumptions

$$\begin{cases} \alpha = 5\% \\ H_0 : \mu_1 = \mu_2 \\ H_A : \mu_1 \neq \mu_2 \end{cases}$$

PDI

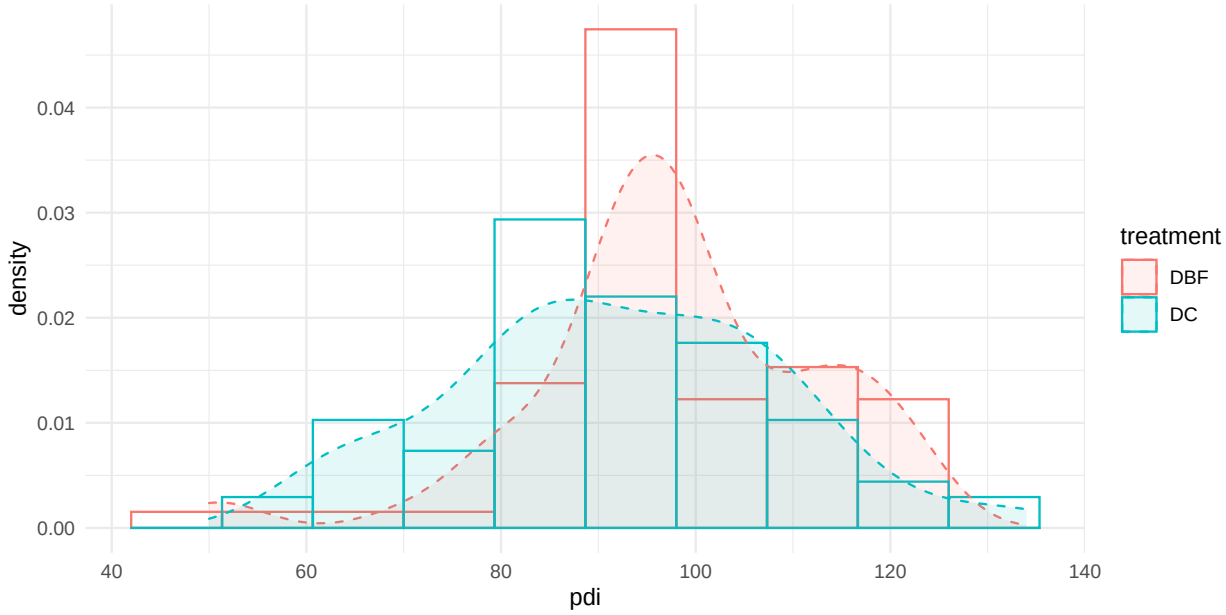
Data description

```
##       pdi         treatment
##  Min.   : 50.00   DBF:70
##  1st Qu.: 86.00   DC :74
##  Median : 98.00
##  Mean   : 94.78
##  3rd Qu.:105.00
##  Max.   :134.00
##  NA's   :1
```

```
## [1] "Total obs.: 144"
```

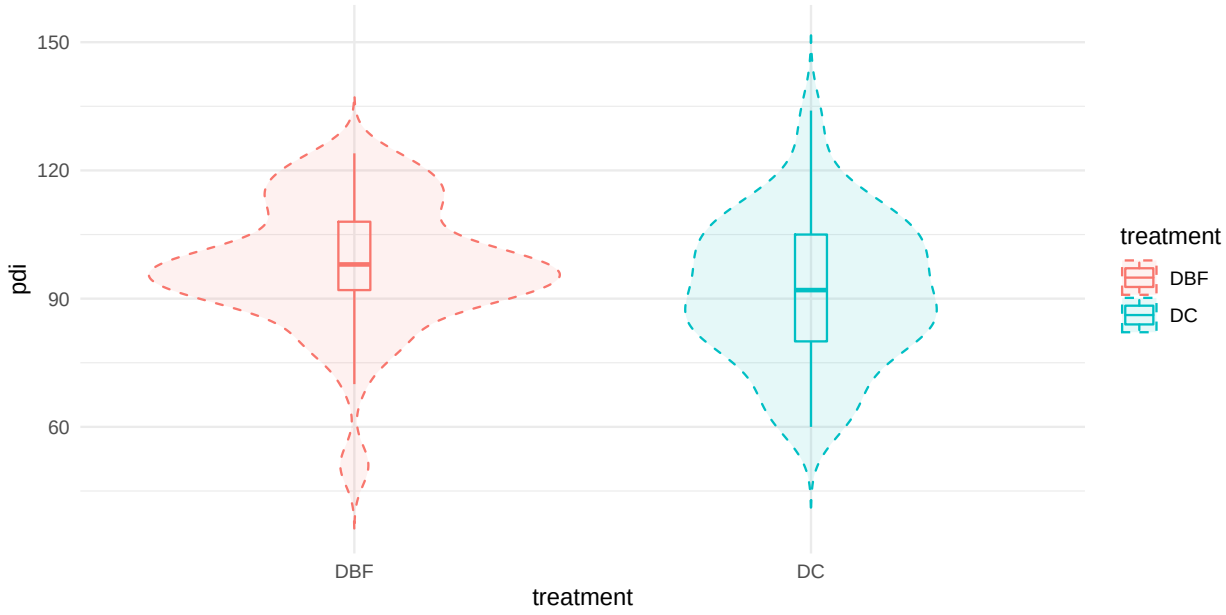
Data distribution

Histograms and (continuous) kernel density estimation (dashed)

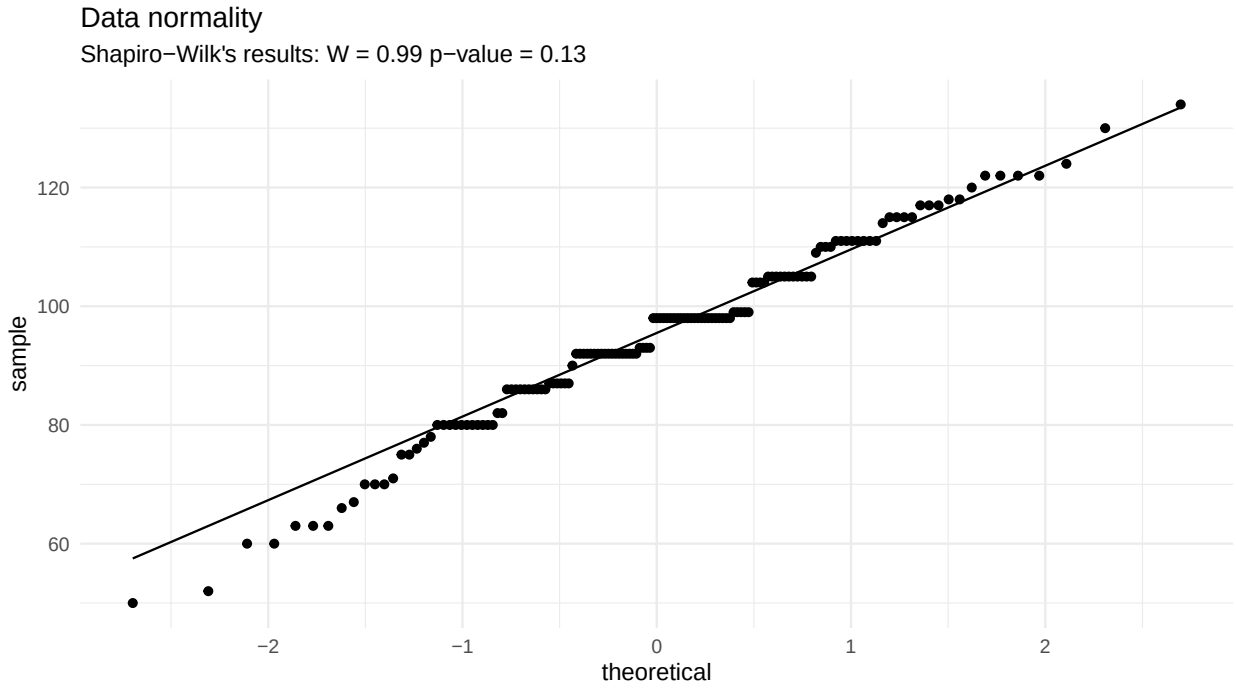


Data comparison

Violin and boxplot



Is the population distribution normal?



There is no evidence that pdi is not normal (p = 0.13), and it is visually close to a normal distribution.

Are the variances different?

```
## Levene's Test for Homogeneity of Variance (center = "mean")
##        Df F value  Pr(>F)
## group   1  2.8154 0.09558 .
##       141
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

There is no evidence of different variances (p = 0.09).

Are the means different?

```
##
##  Two Sample t-test
##
## data:  na.omit(.$DC) and na.omit(.$DBF)
## t = -2.2385, df = 141, p-value = 0.02676
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -11.0232390  -0.6840017
## sample estimates:
## mean of x mean of y
##  91.91781  97.77143
```

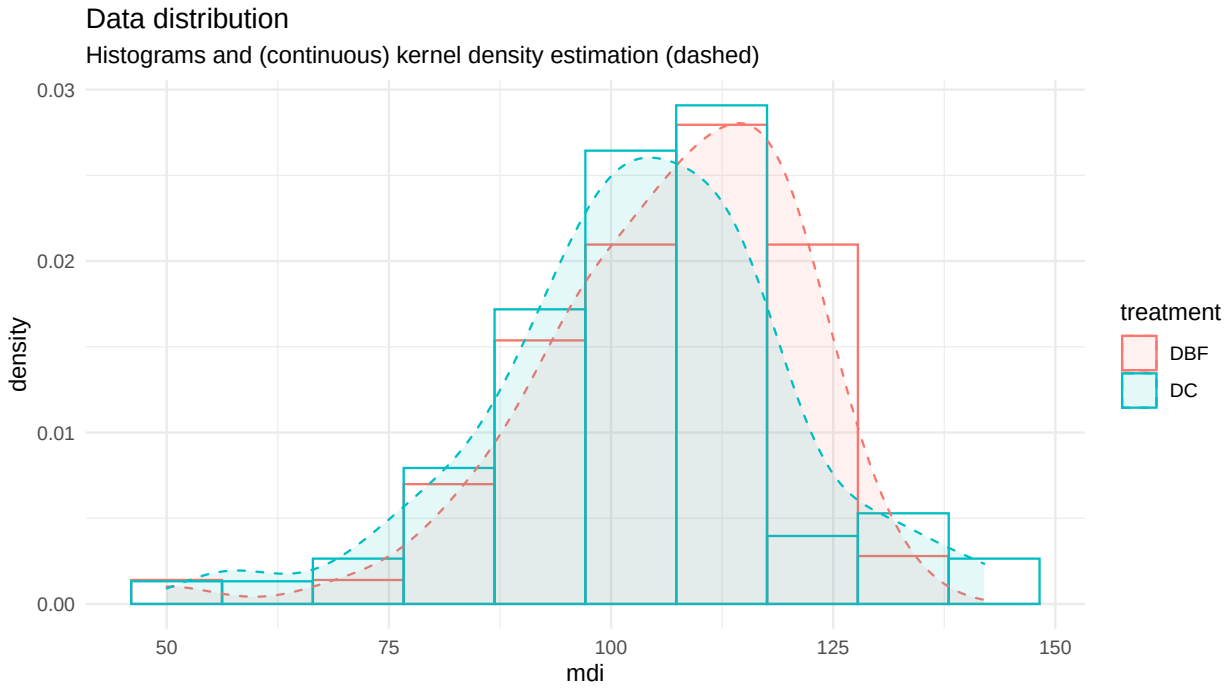
There is evidence that the distr. means are different (p = 0.03).

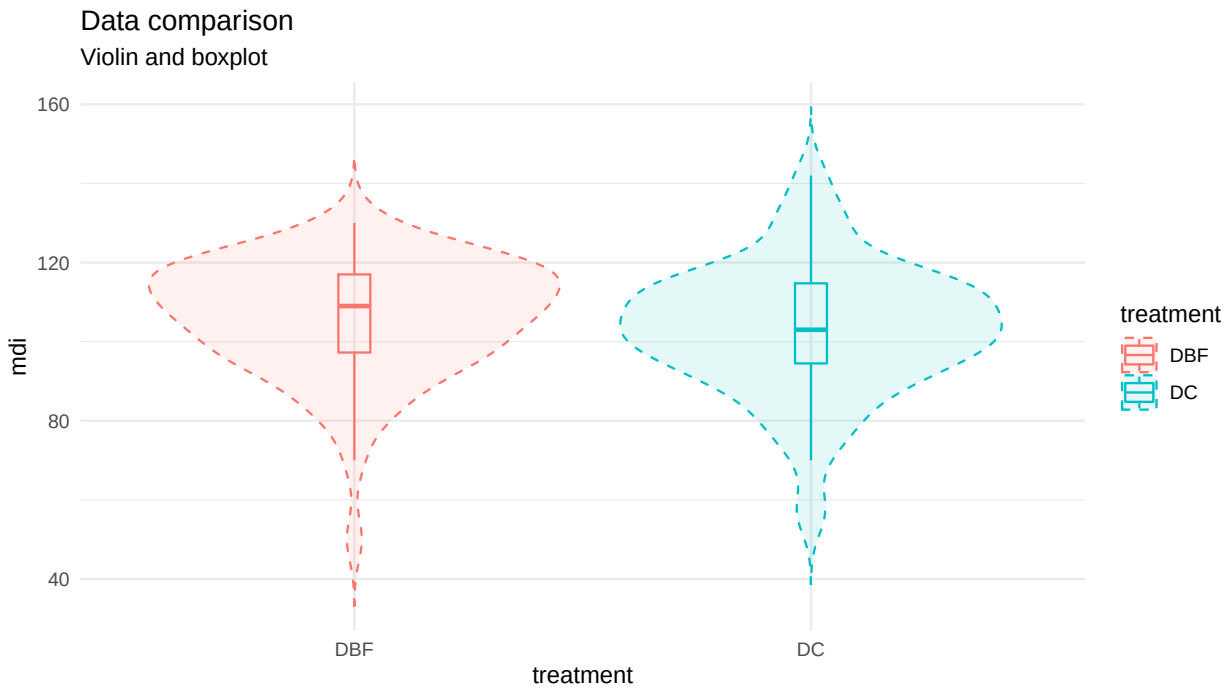
MDI

Data description

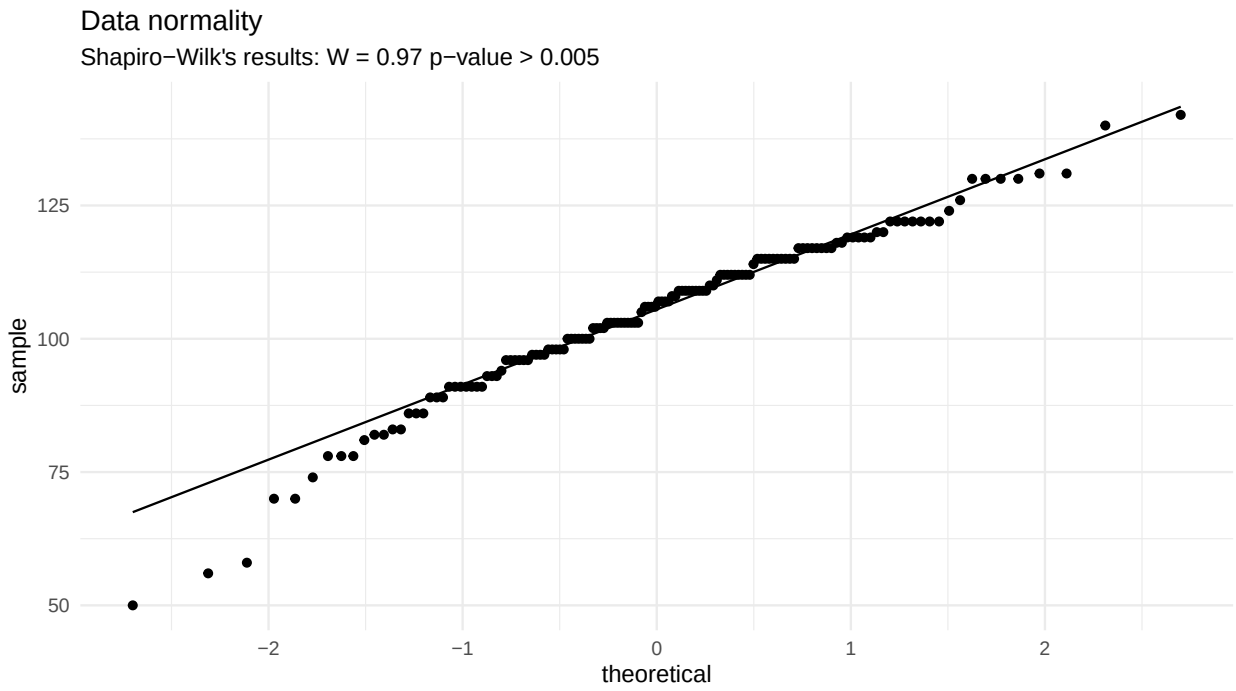
```
##       mdi        treatment
##  Min.   : 50.0   DBF:70
##  1st Qu.: 96.0   DC :74
##  Median :106.5
##  Mean   :104.7
##  3rd Qu.:115.0
##  Max.   :142.0

## [1] "Total obs.: 144"
```





Is the population distribution normal?



There is evidence that mdi is not normal ($p > 0.005$), and it is visually skewed.

Are the variances different?

```
## Levene's Test for Homogeneity of Variance (center = "mean")
```

```
##        Df F value Pr(>F)
## group   1  0.4043 0.5259
##       142
```

There is no evidence of no different variances (p = 0.53).

Are the means different?

```
##
##  Welch Two Sample t-test
##
## data:  na.omit(.$DC) and na.omit(.$DBF)
## t = -1.2511, df = 141.39, p-value = 0.2129
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -8.353798  1.878122
## sample estimates:
## mean of x mean of y
##  103.1622  106.4000
```

This t-test considers two different variances. Ignoring the lack of data normality, there is no evidence that the distr. means are different (p = 0.21).

Conclusion

The sample mean PDI of DBF patients is higher than the sample mean PDI of DC patients.

However, we cannot state that sample mean MDI of DBF patients is different than the sample mean MDI of DC patients.