

Project 7

The data set is based on the study of Sydó et al (2014). This study aimed at knowing the relationship between age and the maximum heart rate during a treadmill exercise known as Bruce protocol. The data set contains the following variables:

- Age – age of individuals in years
- Female – 0 (male) and 1 (female)
- Res_hr – resting heart rate
- Peak_hr – maximum heart rate during the exercise

The objective is to study the relationship between age and the maximum heart during the exercise. To address this objective:

1. Perform a descriptive analysis (e.g., summary statistics/plots) for each variable. Construct plots that allow the visualization of the relationship between age and the maximum heart. Calculate appropriate measures of associations for the relationship between age and the maximum heart and provide an initial interpretation of the data.
2. Perform a linear regression analysis using “Peak_hr” as the outcome and the remaining variables in the data set as covariates. Is “Age” significantly influencing the outcome variable? Is the sex of the individuals significantly influencing the outcome variable?
3. Validate the model estimated in the previous point by assessing the assumptions of the linear regression with an appropriate residual analysis. Is the model reasonable validated?
4. Apply an adequate non-parametric statistical test from survival analysis to compare females and males in terms of the distributions of the maximum heart rate. Provide your reasoning for the chosen test. Draw your conclusions.
5. Perform a Weibull regression analysis using “Peak_hr” as the outcome and the remaining variables in the data set as covariates. Is “Age” significantly influencing the outcome variable? Is the sex of the individuals significantly influencing the outcome variable?

Prepare a presentation with all your findings. Provide the R scripts or the R markdown of the analysis.

Note:

The data set provided is the original one, but do not feel tempted to use the published results as guidance. The statistical analysis of the original study is insufficient.

Reference

Sydó N, Abdelmoneim SS, Mulvagh SL, Merkely B, Gulati M, Allison TG. Relationship between exercise heart rate and age in men vs women. *Mayo Clin Proc.* 2014 Dec;89(12):1664-72. doi: 10.1016/j.mayocp.2014.08.018.