In a study of 30 patients hospitalized with heart failure who participated in a randomized trial of three treatments: enhanced teaching in hospital, usual care in hospital, and enhanced teaching with home care we build a multiple regression model to predict the heart failure self-care [dependent/outcome variable] with two predictors [independent variables] (age and social support) in the model.

**Steps in hypothesis testing**

1. State the null and alternative hypothesis, determine if directional and if using two-tailed or one-tailed test

* Null: there is no relationship between either of our independent variables (age and social support (SSQ)) and the score on the heart failure self care index
* Alt: there is a relationship between our independent variables (age and social support (SSQ) and self care score: age and SSQ will predict HF\_SCI
  + Non directional using two tailed test

1. Decide what test statistic to use; Establish the level of significance (usually 0.05)
   * F test for model and t stat for variables with alpha=0.05
2. Check the data to see if meet the necessary assumptions for the test statistic chosen
   * Level of measurement: DV must be continuous (interval/ratio)
   * Check that our covariates are not highly correlated: Recall in a learning activity in module 7 we found that age and SSQ were not correlated .
3. Compute the test statistic—perform a linear regression model
   * + S & Excel users will obtain same information just appears differently



1. Write the results of the F-test for the multiple linear regression to predict the heart failure self-care [dependent/outcome] variable with two predictors [independnet variables] (age and social support) in the model.

 The f test in the ANOVA for the regression to predict heart failure self-care from age and social support is statistically significant at the 0.05 level (F= 23.17, p < 0.001). We conclude that the overall regression is significant.

2. Write the estimated regression equation from the multiple linear regression results.

**heart failure Self-care score = -3.09 + 0.52(SSQ:Social support) + 0.15(Age)**

 3. What are the *R2* value and Adjusted *R2* value for the multiple linear regression? What does this mean?

*R2* = .63 and adjusted *R2*=.60. This indicates that a good deal of the variability of self-care is captured by the model.

The two independent variables (age and social support) in this model explained a total of 60% of the variance in “self-care”.

 4. For each of the estimated regression coefficients in the estimated regression equation, write a sentence of interpretation describing the coefficient estimates.

The regression coefficient for social support is 0.52 and it is significant (p<.001). For each increase of one point in the Social Support Scale, the Heart Failure Self-care Index increases on average by 0.52.

The regression coefficient for age is 0.15, however, the p-value for age (0.34) which is greater than the alpha level of 0.05, which indicates that it is not statistically significant. For every one year increase in age, the Heart Failure Self-care Index increases on average by 0.15.

5. Summarize the multiple linear regression analysis results in a format suitable for a journal article.

* + Regardless of what statistical program you used you can still report the findings the same way:

The aim of this research was to identify what characteristics of heart failure patients might have a relationship with self-care. The final model was significant (F=23.17, p<.001) and accounted for 60% of the variance in self-care. Multiple linear regression analysis results showed that higher self-care scores were related with higher social support scores (beta=0.52) while adjusting for age. Social support was significantly associated with self-care (t=6.79, p<.001). The relationship between age and self-care was not statistically significant (t=0.97, p>.05).

6. Does a 72 year old with a social support score of 50 have better heart failure self-care than an 85 year old with a social support score of 100?

72 yr old heart failure Self-care = -3.09 + 0.52 (50) + 0.15(72)= 33.7

85 yr old heart failure Self-care = -3.09 + 0.52(100) + 0.15(85)= 61.7

The 85 year old has better self-care as higher score are better.