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 explore whether there is a relationship between a) age and social support (SSQ): does age predict SSQ? and b) self-care (HF\_SCI) and social support (SSQ): does self care predict SSQ?.

**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 age and social support (SSQ)
* Alt: there is a relationship between age and social support (SSQ): age will predict SSQ
  + Non directional (not indicating if positive or negative relationship) using two tailed test

1. Decide what test statistic to use; Establish the level of significance (usually 0.05)
   * Following a scatterplot we will use simple linear regression with alpha=0.05
2. Check the data to see if meet the necessary assumptions for the test statistic chosen
   * Level of measurement: Both variables are continuous (interval/ratio)
   * This is a small sample size so the normality assumption is not likely to be valid, but if the central tendency measures are somewhat equivalent the t-test can still be used- look if mean=median=mode . (since we are just learning how to do this we are using small datafiles so assumptions are bound not to hold, but good practice to learn the steps for real life situations)
     + IS users will find the Q-Q scatterplot indicating not a normal distribution
     + Excel: the HFSC mean =51 and median =45 of the HFSC score and SSQ mean 85.5, median=82
   * Should be a linear relationship –can check by plotting the scatterplot
   * Equal variance

Note: when displaying scatterplots try to remember to plot the outcome (y-variable) on the y axis and the independent or predictor variable (x) on the x-axis.

The equation would be SSQ= a +b(age)

1. Compute the test statistic—perform a linear regression model
   * + IS & Excel users will obtain same information just appears differently

Model Fit Statistics: F(1,28) = 0.142, p = 0.71, R2 = 0.005, adj. R2 = -0.030

Linear Regression Coefficients:

| **Variable** | **B** | **SE** | **t** | **p** |
| --- | --- | --- | --- | --- |
| (Intercept) | 94.307 | 24.256 | 3.888 | 0.00057 |
| Age | -0.142 | 0.376 | -0.377 | 0.70891 |

1. decide to accept or reject the null hypothesis; Obtain p-value- determine statistical significance
   * + IS & Excel users Model fit indicates p>.05 accept null hypothesis
2. Clearly state the conclusion in words using the statistics as evidence not the finding in of themselves. (e.g., so you found significant differences in the means -well this alone doesn’t tell anyone anything. Instead describe what the results mean by writing it in words what test you used, which group had what value, how the means differed, etc.)
   * Regardless of what statistical program you used you can still report the findings the same way:
   * Simple linear regression was conducted to assess the ability of age to predict SSQ. Age explained .5% of the variance in SSQ (R2=.005). The linear regression model was not significant (F=0.1422, p=.71), meaning the age variable was also not significant. For each year increase in age, the SSQ score decreased by .142 points (beta=-142, p=.71). We accept the null hypothesis that there is no relationship between age and SSQ. You can now fill in the equation SSQ= 94.31 -0.142(age)
3. In brief answers for self care and social support (SSQ)

The equation would be SSQ= a +b(HF\_SCI)

Model Fit Statistics: F(1,28) = 45.464, p = 2.543e-07, R2 = 0.619, adj. R2 = 0.605

Linear Regression Coefficients:

| **Variable** | **B** | **SE** |  |  | **t** | **p** |
| --- | --- | --- | --- | --- | --- | --- |
| (Intercept) | 24.575 | 9.820 |  |  | 2.503 | 1.844e-02 |
| HF\_SCI | 1.199 | 0.178 |  |  | 6.743 | 2.543e-07 |

* + Simple linear regression was conducted to assess the ability of the heart failure self care index to predict SSQ. Self care explained 62% of the variance in SSQ (R2=.619). The linear regression model was significant (F=45.46, p<.001). For each point increase in self care, the SSQ score increased by 1.2 points (beta= 1.2, p<.001). We reject the null hypothesis as our findings provide support that self care is a predictor of social support. You can now fill in the equation SSQ= 24.58 + 1.2(HF SCI)