BS805 Fall 2022 Week 6

Be sure to follow the *Assessment Guideline 1: Writing up Homework* at the end of the syllabus in preparing the homework for submission.

Homework assignments need to be uploaded to the blackboard website by 2 PM on the due date.

In each homework report, be sure to include an introductory and a summary paragraph.

Fibromyalgia is a syndrome of widespread body pain that is often treated by rheumatologists. One way of measuring the impact of fibromyalgia on patients is the Fibromyalgia Impact Questionnaire (FIQ). On the FIQ, high values show greater impact of disease (bad) and low values show lesser impact of disease (good). We have data on women with fibromyalgia who attended one of two types of disease self-management classes or who received standard care (the control group).

Data from this study are in the file ***fibr03_f22.txt*** on the BS805 website in the Assignments folder for Class 6. The variables in the data file are:

1. FIQ score taken after the classes
2. Group (1 = class 1, 2 = class 2, 3 = standard care)
3. Disease Severity (On a scale of 1 to 6) before the classes
4. Age (years)

Since the data were entered into this file, information on a new patient has been found. The new patient is in the control group, has FIQ=6.2, Disease Severity=2, and Age=19 years.

A) Create a permanent SAS data set and add in the new patient. For subsequent analyses, this revised data set. Next, create a temporary SAS data set using these data. In the data set, create a set of dummy variables (0,1) that code for group membership.

B) Run a one-way ANOVA model that uses group as the single factor and FIQ score as the outcome. Does the mean FIQ differ between groups? If so, are there significant differences between certain groups and not others? Fully report on the results of the ANOVA model.

C) Run a linear regression model with only the dummy variables that define the group variable. Do the regression results for the group effect match those from the ANOVA model?

   Also, run a simple linear regression model with group as ordinal variable (there should be only one slope estimated in this model). What assumption is made when using the ordinal version of the group variable that is not made when analyzing the data using dummy variables? Do the results of these analyses support this assumption? Present specific numeric evidence that support your conclusion.

D) Run a multiple linear regression model with the dummy variables for group membership in addition to continuous disease severity and continuous age. There should be four slopes estimated in this model. Report on the results of this analysis. Do either of the disease-management classes differ in FIQ compared to standard care group? Are these results similar to those from the one-factor ANOVA

in part B or the linear regression in part C? Is there joint confounding of the group-to-FIQ relationship by disease severity and age? Present specific numeric evidence to support your conclusion.

Are there additional analyses that were not done here that would statistically test whether or not this model is adequate? If so, what analyses would you conduct in addition to this model to perform this test?