Exercise Sheet 3 — Graphics and Simple Inference

Problem 1. Acupuncture for chronic headache in primary care: large, pragmatic, randomised trial

Consider the data set `acupuncture_trial.xls` that contains data of a study on acupuncture for the treatment of chronic headache disorders. Information on the data and the original paper can be found at `http://www.bmj.com/content/328/7442/744.full`. The variables that we will consider for analysis are

`id` identification number

`age` age

`sex` gender

`group` 0: control; 1: acupuncture

`pk1`, `pk2`, `pk5` Severity of headache at visits at baseline, 6 month and 1 year, respectively. The severity score is assessed on a likert scale that ranges from 0: "no headache" to 5: "Intense, incapacitating headache". Severity of headache was recorded four times a day and the total summed to give a headache score

`f1` **to** `f5` Frequency of headache

`gen1` **to** `gen5` SF36 general health score. The SF36 is a quality of life questionnaire looking at several dimensions of well being. The general health score is a summary quantity.

`completer` 1 if the patient gave data until the end of the trial

(a) Compare the change between baseline and 1 year of severity of headache, frequency of headache and SF36 general health score between the controls and acupuncture groups. Discuss on which test is appropriate for each outcome variables.

(b) The significance level for each of the three tests is fixed at $\alpha = 5\%$. What is the probability of making at least 1 error in the 3 tests?

(c) Devise graphics that explore the evolution of the severity score, frequency of headaches and SF36 general health score over the 3 visits in each group. Conclude.

(d) Perform a graphical analysis to study whether age, gender and migraine influence the response to treatment, e.g., does acupuncture works better for migraine patients as compared to controls?

(e) Compare the change between baseline and visit 2 of severity of headache between patients who completed the trial and those who haven't (variable `completer`). Are the conclusions drawn in question (a) still appropriate?