

Midterm Exam

due 11:15 am in class, 1 Nov

Rules for the exam:

1. Do not discuss the exam with other students or TAs. Email questions to me. I will have extra office hours: 2-3 on both 28 and 31 October.
2. Limit your answer to 3 pages, one side of each page. Please attach a copy of your SAS code as an appendix to your answer—this does not count as part of your 3 pages. You will lose points for extra pages.
3. All SAS output should be in Consolas font.

This exam uses data (midterm-2011.xls) from a cohort study of adults with type I diabetes. The variables are:

- `id` = participant's ID number;
- `AER` = albumin excretion rate. This is a measure of kidney function; low numbers are good because the kidneys are not supposed to excrete very much albumin.
- `WHR` = waist-hip-ratio = circumference at waist divided by circumference at hip. This is a measure of obesity; low numbers are good.
- `sex` = M (male) or F (female);

The research question: *Is there a difference between genders in AER, adjusting for WHR?*

1. Check the data for problems. Report any transformations you make and outliers you omit (give reason and ID number). After that, omit observations with missing values. Use the remaining data for all the rest of the problems. Give the number of observations in your final data.
2. Do a test to compare AER between genders without adjustment. Put the results in the table for part (8).

3. Do a test to compare AER between genders, adjusting for WHR as a continuous variable. Put the results in the table for part (8).
4. Use Proc RANK to divide WHR into quintiles (equal fifths), defining the categorical variable QWHR to label the quintiles. Report the minimum and maximum WHR for each quintile.
5. Do a test to compare AER between genders, stratifying by QWHR. Put the results in the table for part (8). Display the interaction plot, with QWHR on the horizontal axis.
6. Make a 2×5 table showing the number of men and women in each quintile.
7. Do a test to compare AER between genders stratifying by QWHR, but restrict the data to only those quintiles of WHR that contain at least 25 males and 25 females. Put the results in the table for part (8). Report which quintiles you used, and the total sample size in the model.
8. Make a table with columns for each gender. Display the AER results on the original scale—means, estimates of variability, p -value—in separate rows for parts (2), (3), (5), (7). Give your answer to the research question above.
9. If you could report only one adjusted comparison from the table in part (8), which one would you report? Briefly justify your choice.
10. Is WHR a mediator for gender in model (3)? It's possible, because these are adults, so their current WHR comes after gender.

Check the criteria in Lecture 13, page 25, and perform the Baron-Kenney test for mediation on page 27. Show your computations for the test statistic z .