

Math 483/593 Multivariate Statistical Analysis

Term Project, Spring 2007 (Due Thursday May 24)

- Note:**
1. Late projects will NOT be accepted.
 2. You have to write the project paper as if you are submitting a statistical report to the company you are consulting, assuming that they are not statisticians. Your paper must be concise, precise, and easy to read (please type in a Word Process).
 3. Carefully labeled and captioned outputs (e.g., Table 1, ..., Figure 1,...) should be inside of your paper or attach as appendices. The SAS outputs must be well summarized and organized in tables and figures. Do not turn in the raw SAS outputs. Resize figures and tables. Do NOT turn in any outputs not discussed.
 4. To receive a full credit you must include complete discussions and your paper must be brief and well organized. Do not exceed 10 pages, excluding tables and figures.
 5. A good example report can be shown in my office.
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The severe unilateral facial electric shock like pains provoked by light touch make trigeminal neuralgia (TN) one of the most severe neuropathic pains resulting in significant social disability. Treatment currently begins with drug therapy essentially anticonvulsants. Some patients will use drug therapy for many years and find it gives adequate pain relief and acceptable quality of life whereas in other patients surgery is resorted to within 5 years of diagnosis. A wide range of surgical treatments are available with posterior fossa surgery such as microvascular decompression (MVD) or partial sensory rhizotomy (PSR) providing the longest periods of pain relief but equally having the most significant albeit low mortality and morbidity.

It is postulated that (1) patients who are pain free, with no complications and not requiring drug therapy are likely to have a high quality of life whereas (2) recurrence of pain, complications either due to surgery or drug use results in reduced quality of life. (3) As PSR results in a higher incidence of complications it likely that these patients will have reduced quality of life compared to patients who have had an MVD. (4) Patients also want to know whether the risk of surgery is worth taking in order to get improved quality of life compared to medical treatment. (5) Up to 70% of patients will get a recurrence of pain but it is not known how this affects quality of life and does it become similar to those patients who are being managed on drug therapy.

To study the relation between the treatment variables and the quality of life (QOL), the joint research team in US and UK conducted a survey from TN patients who received a surgical treatment (MVD or PSR) or drug therapy (MED). The survey is very comprehensive and contains 44 main questions regarding the results from the treatments, SF12 (a widely used questionnaire for QOL), McGill pain questionnaire, Hospital Anxiety and Depression Scale (HAD), etc. For more information about the questionnaire and the data, please see

Zakrzewska, J.M., Lopez, B., and Kim, S.E., Patients' reports of satisfaction following partial sensory rhizotomy and microvascular decompression for trigeminal neuralgia, *Neurosurgery*, 56,1304-1312, 2005

Zakrzewska, J.M., Lopez, B., and Kim, S.E., Patient satisfaction after surgery for trigeminal neuralgia - development of a questionnaire, *Acta Neurochirurgica*, 147(9), 925-932, 2005

A part of data is posted. A definition of each variables and an explanation of its coding are as follows:

Patient Info

ID	patient ID
age	age
ageband	1= below 45, 2=between 45 and 65, 3=over 65
sex	M=male, F=female

Treatment variables

proc	surgical procedure (MVD, PSR) or medical (MED)
recur	n=no recurrence, y=recurrence
outcome	1=complete pain relief, 2=partial pain relief, 3=no relief
comp	1=no complication, 2=some complication, 3= complications related to subsequent surgery
painnow	1=no pain now, 2=pain now

Quality of Life variables (rescaled scores)

PF	Physical Functioning
RP	Role Physical
BP	Bodily Pain
GH	General Health
VT	Vitality
SF	Social Functioning
RE	Role Emotional
MH	Mental Health

Use appropriate multivariate methods to address the hypotheses listed in the second paragraph above (you may want to do more for extra credits☺). Your report should include (but not limited) brief description of the study and the data, the goals of the analysis, approach and methods, and summary of the findings from the analyses. Good luck.