Clinical Biostatistics

Revision exercise: Trial of physiotherapy for low back pain

Read the attached paper 'Randomised controlled trial of physiotherapy compared with advice for low back pain' (*BMJ* 2004; **329**: 708-711. N.B. the paper attached is the longer on-line version.)

The SF-36 (Medical Outcome Short Form (36 items) Health Survey) is a widely-used measure of generic health status in the general population. From the 36 items, eight health profiles are derived from summarised scores. There are four physical components (physical functioning, role limitations – physical, bodily pain, general medical health,) and four mental components (social functioning, mental health, role limitations – emotional, vitality). 'Repeated measures analysis of covariance' is a method for dealing with measurements made at several times. It is beyond the scope of our course. In the column headed 'analysis of covariance', the first number is the P value before the adjustment and the second, in parentheses, the P value after the adjustment. This is not a standard usage.

1. 'Responders were older (mean age 43 (SD 15) *v* 37 (13); $P < 0.001$), less likely to smoke (39 (22%) *v* 50 (47%); $P < 0.001$), . . .' (Results). What methods mentioned in the Methods section could they have used to calculate these two P values and why? (N.B. the two P values were calculated using different methods.)
2. 'Responders were older (mean age 43 (SD 15) *v* 37 (13); $P < 0.001$), less likely to smoke (39 (22%) *v* 50 (47%); $P < 0.001$), . . .' (Results). What is a P value and what do these P values tell us?
3. 'We found no differences between the groups in change in scores on the Oswestry disability index at 12 months (mean difference –1.04, 95% confidence interval –3.7 to 1.59) . . .' (Results and Table 2). What is a confidence interval and what does this one tell us?
4. The authors say that they found no differences between the groups in change in scores on the Oswestry disability index. What do they mean by this and is this a reasonable statement?
5. In Table 2, the authors quote effect sizes. What do they mean by this and why is it a useful thing to do for a disability index?
6. In Table 2, the authors give P values for a disability index score adjusted for score at baseline and several other variables. What does 'adjusted' mean here and why did they do it?
7. In Tables 2 and 3, the authors give P values for analysis of covariance. What is 'analysis of covariance' and what assumptions must we make about the data?
8. In Table 4, the authors give relative risks for perceived benefit. What is a 'relative risk' and what does a relative risk of benefit of 1.28 tell us?
9. In Table 4, the authors give P values for perceived benefit versus no perceived benefit, adjusted using logistic regression. What is 'logistic regression' and why was it used here?
10. The authors conclude that 'Routine physiotherapy seemed to be no more effective than one session of assessment and advice from a physiotherapist.' (Abstract). Do the data support this conclusion?